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COLLEGE INTERNATIONAL DES CHIRURGIENS

The Journal of the International College of Surgeons

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Vol. XII MARCH-APRIL, 1949 No. 2

Original Articles

The Technique of Parotidectomy

HAMILTON BAILEY, F.R.C.S., F.A.C.S., F.I.C.S., F.R.S.E.
LONDON, ENGLAND

PARTIAL or complete parotidectomy is indicated for:

1. Parotid tumors.
2. Congenital parotid sialectasis.
3. Certain cases of tuberculous lymphadenitis of the parotid group of lymph nodes with sinus formation.
4. Intractible salivary fistula—failure of other methods of treatment.

Of these indications the most frequent is parotid tumor, and it is to the complete extirpation of parotid tumors that attention particularly is directed.

There are three types of the operation: extracapsular resection, superficial lobectomy and complete parotidectomy. The widespread belief that a salivary fistula frequently follows the removal of a portion of the parotid gland is unfounded and fear of this complication need not deter the operator from excising sufficient normal parenchyma to ensure that all the diseased parotid tissue has been removed intact.

FULL EXPOSURE OF THE PAROTID GLAND IS REQUIRED

Many parotid tumors, which on clinical examination feel circumscribed and tolerably mobile, when displayed to the light of day prove to be veritable icebergs—four-fifths being beneath the surface. Again, approximately a quarter of these neoplasms originate in the deep lobe of the parotid. In one out of every four cases there is a considerable thickness of normal parotid parenchyma and the main divisions of the facial nerve lie between the tumor and the subcutaneous surface of the gland. Furthermore even if the tumor is as small as it was believed to be before the operation and is placed comparatively superficially, it has been proven that this type of tumor frequently reappears after surgical intervention undertaken through a short skin incision.

It was the tragedy of early recurrence (due in a large measure to inadequate exposure) that brought the operative treatment of parotid tumors into disrepute. For these reasons, before an attempt is made to remove any parotid tumor, full exposure of the parotid gland is necessary. It is only when the whole parotid gland has been displayed, and sometimes only after the superficial lobe has been rendered mobile (so that its thickness can be palpated between the finger and the thumb), that the true location and extent of the tumor

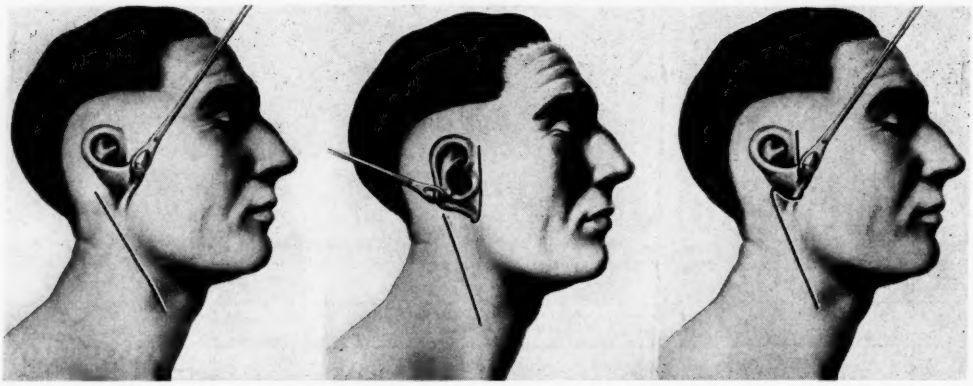

Fig. 1. A. The cervical incision. B. The commencement of the facial incision. C. Completion which enables a large faciocervical skin flap to be dissected forward.

can be assessed with the degree of accuracy necessary to formulate a reasoned opinion upon which of the three varieties of parotidectomy should be performed.

Ligation of the External Carotid Artery: This is desirable if not an indispensable preliminary step in parotidectomy. Even after its arterial supply has been cut off, venous hemorrhage from the gland during the operation is considerable. Because hemostasis must be perfect if fine filaments of the facial nerve and often the thin capsule of a tumor are to be visualized clearly, further justification for the routine adoption of this preliminary step is superfluous.

Cervical Skin Incision: This incision about to be described is later employed to help make a large faciocervical skin flap. This cervical incision which extends from the middle of the base (not the tip) of the mastoid process to an inch (2.5 cm.) below the level of the hyoid bone is made over the anterior third of the sternomastoid muscle (Fig. 1A). The anterior edge of the sternomastoid having been freed and retracted, the bifurcation of the common carotid artery is sought. Enlarged lymph nodes encountered during the dissection are removed and saved for transmission to the pathological department. The external carotid artery is identified and ligated below its facial branch.

When the surgeon is assured that hemostasis of the whole wound is satisfactory, retractors are removed and the edges of the wound are allowed to fall together. The neck is covered with an abdominal pack.

Facial Incision: The lobule of the ear is seized with a Lane's tissue forceps and retracted away from the face. The assistant places the flat of the hand on the face and draws the skin away from the pinna. In this way the skin over the parotid gland is stretched and steadied. A vertical incision, commencing at the level of the zygomatic arch is made very close to the pinna (Fig. 1B). It passes downward in front of the tragus and still hugging the junction of the pinna with the face, passes around the base of the lobule to join the extremity of the first incision at the base of the mastoid process (Fig. 1C).

Raising the Faciocervical Skin Flap: The cervical and the facial incisions having been joined, then a large faciocervical skin flap can be dissected forward. When the faciocervical skin has been undercut sufficiently, it is given to the assistant to hold in a swab. He is instructed to lift the flap while the undercutting proceeds. Venous hemorrhage is usually troublesome and it has been personally noted that bleeding is less when the operation is conducted under local anesthetic.

Undercutting of the skin flap continues until the buccinator muscle is seen—the whole of the superficial aspect of the parotid gland, which varies considerably in size, is now in full view.

What Operation Should Be Performed? It is at this stage that thorough palpation of the

whole gland is possible, and the surgeon must make up his mind which of the following three procedures is suited to the particular case:

1. Extracapsular resection.
2. Superficial lobectomy.
3. Total parotidectomy.

EXTRACAPSULAR RESECTION

When the surface of the parotid gland has been fully exposed it is possible to form a more accurate idea of the size and location of the tumor than at a clinical examination. In some cases after the faciocervical flap has been dissected up, it may become apparent that the tumor is manifestly superficial. It is only with comparatively small tumors situated in the superficial lobe which are suited to straightforward extracapsular resection. If any doubt exists whether the tumor is situated superficially in the superficial lobe, it is better to mobilize the superficial lobe. After this procedure has been carried out the whole thickness of the gland can be palpated thoroughly between the finger and the thumb.

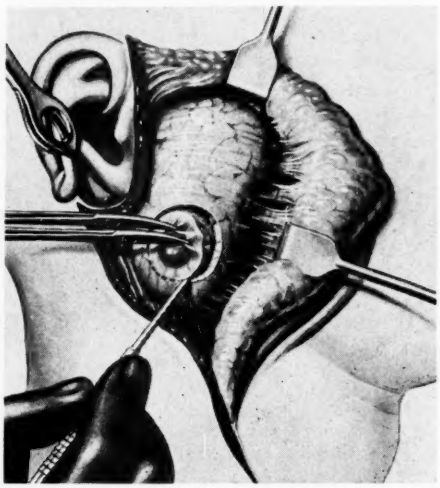

Fig. 2. Extracapsular resection of a tumor in the superficial lobe of the parotid gland.

Once again the operator asks himself the question, *'What operation should be performed?'*

The objective of extracapsular resection is, as the term implies, to excise the tumor with its capsule absolutely intact. The only method of achieving this objective regularly and successfully is to sacrifice about a quarter of an inch (.6 cm.) of normal parotid tissue surrounding the capsule of the tumor. In order to facilitate what may be termed excision en

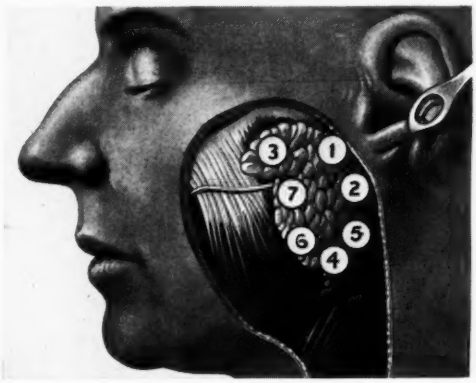

Fig. 3. A plan for mobilizing the superficial lobe of the parotid gland.

bloc, it is permissible for the purpose of traction, to attach hemostats (Fig. 2) or other tissue grasping forceps to normal parotid tissue.

If this expedient is employed, on no account must the forceps be applied within a hallowed area of a quarter of an inch around the capsule, or the capsule is in imminent danger of being torn asunder. During the deeper stages of the excision the best tractor is the surgeon's fingers, and a gauze swab moist with 60 percent alcohol which not only helps to prevent the tumor from slipping but will kill spilled cancer cells if by some mischance the surgeon should fail in his avowed object to preserve the integrity of the capsule.

Reliable statistics proved that in approximately 30 percent of cases, recurrence took place after excision of mixed parotid tumors and it was the small early ones that recurred more frequently than those moderately sized. If the tumor is excised with its capsule intact —and if the above technique is followed the integrity of the capsule is safeguarded—the expectation of permanent cure is 100 percent.

SUPERFICIAL LOBECTOMY

Temporary Resection of The Mastoid Process: Employing a periosteal elevator the whole of the base of the mastoid process as it joins the skull proper, is cleared of pericranium. A broad chisel is taken and with one or two smart taps with the hammer, the mastoid process is severed from the skull. The musculotendinous insertion of the sternomastoid as it blends with the tip of the mastoid process is grasped with Morrant Baker forceps, and the mastoid process, with the muscle attached, is freed from the parotid fascia by sharp dissection.

When this step has been completed by suitable pulling upon the lobule of the ear, the cartilaginous auditory canal is freed from the capsule of the parotid gland. The previously inaccessible posteroinferior corner of the parotid gland can now be grasped between the finger and the thumb and raised and beneath it is a recess in which the styloid process can be palpated. It is in this recess that the main trunk of the facial nerve as it issues from the stylomastoid foramen is situated. It is seldom that the nerve can be seen readily, and at this stage of the operation it is inadvisable to disturb the region unduly in order to seek it.

Mobilizing The Superficial Lobe: (The following parenthetical numerals refer to Fig. 3). Commence by defining the periphery of the parotid. Reflect the edge (1) of the gland forward, proceeding downwards (2) dissect with a sharp scalpel and from time to time by inserting and opening the blades of a hemostat (hemostat dissection) until the rounded free posterior edge of the gland is free. Palpate the zygomatic arch; somewhere just below it lies the thinned-out periphery of the gland. Make a transverse incision through the deep fascia at (3) and define this border. This accomplished, proceed to isolate the lower border of the gland; here great variations exist. Sometimes the parotid gland has a cervical prolongation of as much as one inch (2.5 cm.). The anteroinferior corner of the gland (4) can be dissected up with some confidence, for nerve damage here is highly improbable. Seek the inframandibular branch of the facial nerve (Fig. 4) as it runs over the angle of the jaw.

It is most desirable to ensure that the anterior edge, (6) (7) of the parotid gland is freed from the masseter muscle and undermined sufficiently to ensure that the orbital branches of the facial nerve in particular and the buccal branches can be traced toward the main divisions of the nerve.

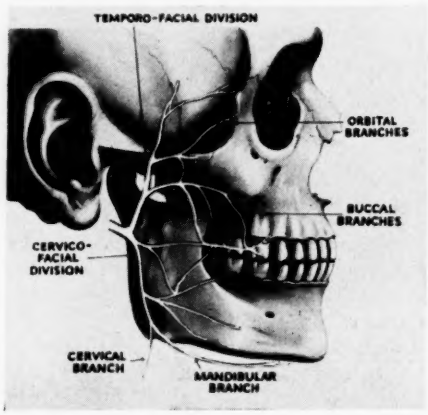

Fig. 4. The disposition of the extracranial course of the seventh nerve in relation to the mandible.

Patient hemostat dissection, aided here and there by a few touches of the scalpel and careful attention to hemostasis are the secrets of success—the most tedious and difficult part of the operation. Stensen's duct is often no larger than one of the branches of the pes anserinus and after viewing it intently scores of times, usually at this stage of the operation it is futile to suggest which of the white strings passing across this field of operation is Stensen's duct. The fact is that one of them is the duct, becoming apparent only after the isthmus of the gland has been severed.

Division of the Isthmus: If the tedious process of mobilizing the superficial lobe has been carried out effectively, the actual resection of the lobe is usually a comparatively straightforward procedure.

No attempt should be made to seek the isthmus of the parotid gland from infront, for this is much better done from below and behind.

The time has come now for the most dramatic stage of the operation. The areas (2),

(5), (4), which previously were freed thoroughly from the sternomastoid muscle and the cartilaginous auditory canal, are lifted up with the index finger applied over a swab moist with 60 percent alcohol. By means of blunt dissection with a Watson Cheyne dissector the main trunk of the facial nerve is sought. Frequently it becomes apparent almost at once.

In cases where the tumor was wedged between the mastoid and the angle of the jaw, the facial trunk may be displayed medially. Sometimes the facial trunk may be so thinned and flattened as to resemble one of the bands of fibrous tissue which are not uncommonly present in the type of case under consideration, especially those in which a previous operation has been performed. If blunt dissection is employed and nothing is cut without tracing it forward, the facial nerve cannot be mistaken, for it is the size of ordinary parcel string, and even if it is flattened out in this situation, it assumes its normal rounded character when it is traced forward.

The nerve is followed; fortunately it rarely passes into pathological tissue. Should it do so, either the nerve must be sacrificed or the pathological tissue must be cut in order to follow the nerve. Usually it requires little more than blunt dissection to trace the nerve to the isthmus and to see it bifurcate. About half an inch of the isthmus is cut and the superficial lobe is lifted up a little more; the two primary divisions are isolated; the isthmus is more deeply divided. Provided the early dissection (6), (7), (3), was carried out properly, one often finds that as soon as the superficial lobe is detached, Stensen's duct is the only connecting link of the superficial lobe with the side of the face.

On a number of occasions I have been thrilled at being able to display the whole course of the seventh nerve and all its branches as clearly as they are depicted in an anatomical textbook (Fig. 5). At other times it has been noted that this or that branch has been cut, but as long as the main trunk and the temporofacial division can be followed, the end result will eventually be satisfactory. If, in addition, the buccal branches are intact, the result will be good. Even if some of the constituents of the pes anserinus have been

Fig. 5. Superficial lobectomy completed.

cut, it does not necessarily follow that the patient will have readily noticeable facial palsy. In any case the main object of the operation is to extirpate the malignant or potentially malignant tumor in such a manner that local recurrence is impossible.

REMOVAL OF THE DEEP LOBE

The facial nerve can be held aside by passing a ligature beneath it, and usually the deep lobe can be separated from the great vessels of the neck and the pharyngeal wall with comparative ease. Large tributaries of the jugular vein, particularly the common facial vein, are sometimes a source of some embarrassment. In necessary cases there is no objection to ligating the jugular vein above and below its juxtaposition to the deep lobe, but this seldom happens.

Removal of the deep lobe is not required in cases where the tumor has been removed completely in the superficial lobe. It is much easier to mobilize and resect a superficial

lobe containing a tumor than it is to mobilize and resect a substantially normal superficial lobe, e.g. in a case of parotid sialectasis.

Only comparatively recently have I realized that in non-recurrent tumors of the deep lobe it is possible, by full mobilization, to dislocate the deep lobe and turn it forward from the deep recess behind the angle of the jaw. The facial nerve having been traced from the stylomastoid foramen, makes it possible to resect the deep lobe containing the tumor without much disturbance of the pes anserinus.

RECONSTITUTING THE OPERATIVE AREA

Replacing the Mastoid Process: The muscle is grasped in Morrant Baker forceps just beneath the tip of the mastoid process. In this way the sternomastoid muscle is stretched so that the mastoid process can be replaced. The mastoid process is fixed in its original position with a suitable nail.

Suturing the Faciocervical Skin Flap in Position: In the vicinity of the junction of the two skin incisions the cervicofacial skin flap will possess a narrow tongue. It is often a good practice to cut away a part, or all of this triangular piece of skin, not only to obviate possible sloughing of a portion of the skin with an inadequate blood supply, but for another important reason. After a parotid gland bearing a tumor has been removed, there is *too much skin* available. In other words, the skin flap is too large to cover the side of the face without redundancy. The bigger the tumor the greater the excess of skin. So it comes about that by excising an appropriate amount of skin in an appropriate manner, the operator can effect a satisfactory 'facial lift,' suited exactly to the needs of the specific case.

The faciocervical skin flap is sutured accurately into place. Dependent corrugated rubber drainage is provided and a pressure dressing is applied to the facial part of the operation area.

RESULTS OF PAROTIDECTOMY

I have performed parotidectomy 76 times. In 53 cases superficial lobectomy or total parotidectomy has been performed; in the remainder extracapsular resection of a tumor was carried out. Superficial lobectomy or total parotidectomy was undertaken:

1. For parotid tumor—44 cases.
2. For sialectasis*—6 cases.
3. For tuberculous parotid lymphadenitis with sinuses—2 cases.
4. For Boeck's sarcoid—1 case.

In 17 cases the tumor was a recurrent one, in one case it had recurred four times after various operative procedures, and in two cases it had recurred twice. A number of the patients had received radiotherapy without benefit.

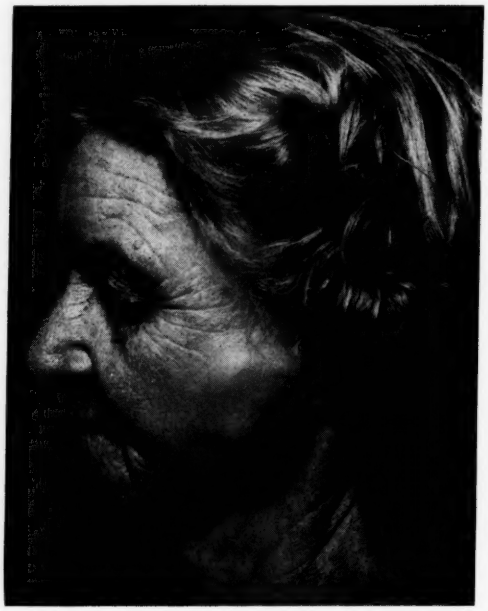

Fig. 6. The original case of parotidectomy.

In six instances the patient had metastases in the neck; these were excised either at the time of the parotidectomy or at a separate se sion and in five of the six cases the invasion of the nodes by the tumor was confirmed histologically. In all these five patients further metastasis has occurred from which four of them have died. In the sixth, obviously enlarged lymphnodes were (unexpectedly reported upon as being inflammatory, and this

* By sialectasis is meant dilatation of the parotid ducts, a condition that may be likened to bronchiectasis of the lung.

patient who had combined total parotidectomy and excision of cervical lymphnodes is alive and well nine years later.

The original case of superficial lobectomy was Mrs. E. R., aged 65, and the operation was performed in February 1937 (Fig. 6). In 1948 she was admitted to a municipal hospital with carcinoma of the stomach and secondaries in the liver. She was seen a year previous to this, and she was well then and without any sign of a recurrence of the parotid tumor (Fig. 7).

Fig. 7. The same patient 10 years later.

All the patients who have had superficial lobectomy or complete parotidectomy performed have been followed and with the exception of one who died accidentally, and those who had secondary deposits at the time of the operation, all (including the recurrent cases) have been traced and have remained cured of their neoplasm for various periods up to 10 years. In 80 percent of cases the report on the histologically variegated neoplasm can be summarized as 'mixed parotid tumor.' In a few instances the pathologist specifically stated that the tumor was a carcinoma. In three instances the tumor was pronounced to be an adenolymphoma.

As for the integrity of the seventh nerve, in two patients no attempt was made to preserve it, because in one patient the nerve had been already cut at a previous operation performed elsewhere, and on the other person the neoplasm (which proved to be an adenolymphoma) was so extensive and friable that the anatomy of the region was confused.

Over 40 percent of the remaining patients had temporary facial palsy lasting for various periods up to one year. Five of the above patients showed signs of facial muscular weakness after a year, but none of them were seriously inconvenienced. One patient has paralysis of the temporofacial division, but by a fortuitous coincidence she is the possessor of a glass eye on that side—the eye having been removed for an accident in childhood. This patient by reason of the glass eye, (although an intelligent woman) is not aware of the fact that she cannot approximate her left eyelid.

In two patients where the operation was performed less than a year ago, full recovery of the facial nerve is improbable. In one of these an immense tumor displaced the nerve medially at the stylomastoid foramen and although the branches are intact, the nerve may be damaged at its exit from the skull. However upon recent reexamination function of the nerve is definitely returning. The cervicofacial division of the other patient entered a very large tumor which had been removed elsewhere a year previously, and I deliberately cut this division.

RIASSUNTO

La parotidectomia e' indicata nei tumori, nelle ectasie salivari congenite, nelle linfadeniti tubercolari del gruppo parotideo con formazione di seni e di fistole salivari altrimenti incurabili. L'operazione comprende la resezione extracapsulare, la lobectomia superficiale e l'asportazione complete della carotide. Una perfetta esposizione della ghiandola e' indispensabile, cio' che richiede la legatura della carotide esterna e l'utilizzazione di un esteso lembo cutaneo cervico-facciale.

I tumori sono generalmente piu' estesi negli strati profondi che verso la superficie, mentre nel 30 percènto dei casi si riproducono dopo l'escisione.

Nella lobectomia superficiale il processo mastoideo viene reciso temporaneamente; il nervo facciale va seguito anteriormente fino alla sua biforcazione. I risultati finali si mantengono ottimi fino a che vengono rispettati il tronco principale, la divisione temporo-facciale e le diramazioni boccali: la recisione di altre branche non esercita un'influenza apprezzabile sui risultati.

SUMARIO

La parotidectomia es indicado en los tumores de la glandula parotida, en la sialectacia congenital de esta glandula, en la linfadenitis tuberculosa de la cadena linfatica de la region parotidea complicada con fistula salivaria intractable. En el tratamiento quirurjico se incluye la reseccion extra-capsular, la lobectomia superficial y la parotidectomia completa. La exposicion amplia de la glandula es indispensable y esto por lo tanto requiere la ligacion de la arteria carotida externa y la utilizacion de un pediculo de piel facio-cervical. Los tumores de la glandula son en general como 4/5 veces mas grandes en su region profunda que en su porcion superficial; y el 30% recurren despues de su reseccion.

En la lobectomia superficial el hueso mastoideo es temporalmente resectado y el nervio facial es disectado hasta el punto de subifurcacion. Si se conserva el tronco principal de este nervio asi como sus ramas temporo-facial, y bucales; la division de sus otras ramas no afectaran el resultado bueno de la operacion.

SOMMAIRE

La parotidectomie est indiquée dans les tumeurs de la parotide, dans la sialectasie congénitale de la parotide, dans la lymphadénite tuberculeuse des ganglions lymphatiques de la parotide avec sinus et fistules salivaires incontrolables. L'opération comprend la résection extracapsulaire, la lobectomie superficielle et l'enlèvement complet de la glande parotide. Pour exposer la glande complètement, il est indispensable de faire la ligature de l'artère carotide externe et d'avoir recours à l'emploi d'un large lambeau cutané faciocervical. Les tumeurs sont généralement plus profondes à la surface inférieure qu'à la surface superficielle et dans 30% des cas il y a récidive après excision.

Dans la lobectomie superficielle, on fait une résection temporaire de l'apophyse mastoïde et on expose le nerf facial jusqu'à sa bifurcation. Tant que le tronc principal, la division temporofaciale et les branches buccales du nerf sont intacts, la division d'une ou deux des autres branches a peu d'influence sur les bons résultats obtenus par le traitement opératoire.

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Sympathetic Conduction Pathways Independent of Sympathetic Trunks—Their Surgical Implications

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SURGERY involving the sympathetic nerves has been based on current concepts of the anatomy and the physiology of the autonomic nervous system. According to these concepts, all sympathetic conduction pathways from the spinal cord to the effector organs traverse the sympathetic trunk. All preganglionic fibers concerned in the sympathetic innervation of visceral organs, including the blood vessels, sweat glands, etc., emerge from the spinal cord through ventral spinal nerve roots.

Current teaching illustrates that preganglionic fibers enter the sympathetic trunk through white communicating rami. Most of them terminate in sympathetic trunk ganglia in synaptic contacts with ganglion cells. Others pass through the sympathetic trunk, traverse the splanchnic nerves and end in sympathetic ganglia located in relation to the abdominal aorta and its branches or in more direct relation to visceral organs.

Postganglionic fibers which arise in the sympathetic trunk ganglia and which are concerned in the innervation of peripheral blood vessels, sweat glands, etc., join the spinal nerves through their sympathetic roots (gray communicating rami). Most postganglionic fibers of sympathetic trunk origin which are concerned in the sympathetic innervation of the head, the thoracic viscera, etc., do not join spinal nerves but reach the effectors in question through sympathetic nerves which arise from the sympathetic trunks. All sympathetic conduction pathways which conform to this general plan are interrupted by extirpation of the sympathetic trunk ganglia which they cross, or by section of the corresponding white communicating rami.

Failure to achieve complete sympathetic denervation of the extremities either by extirpation of the appropriate segments of the sympathetic trunks, or by section of the corresponding white communicating rami, has been observed many times. Also failure to obtain complete sympathetic denervation of various other parts of the body has been reported. Attempts to explain such failures in cases where faulty operative technic could be ruled out, have involved consideration of anatomic variations and the possibility of restoration of interrupted conduction pathways.

The anatomic variability of the sympathetic trunk ganglia and the rami connected with them has been emphasized particularly by Yaeger and Cowley.[9] In a study of the lumbar portion of the sympathetic trunks in 19 human cadavers no two trunks were found similar, consequently no pattern of variation could be established. Moreover the available data relative to differences in other portions of the sympathetic trunks indicate no basic patterns of variation.

Small ganglia associated with communicating rami, primarily the gray rami, or sympathetic roots, have been described. On the basis of an examination of fetal, infant and adult bodies, Gruss[1] concluded that such ganglia are limited to the lumbar region. He observed a ganglion in a communicating ramus connected with the brachial plexus only in one body. In four adult bodies, Wrete[8] found 2 to 14 ganglia associated with the communicating rami in the lumbar segments on one side. Most of them were located in relation to sympathetic roots, and a few were located adjacent to spinal nerves at the junctions of communicating rami.

In dissections of five adult bodies Skoog[6] demonstrated small ganglia in the communicating rami of the cervical and the first thoracic spinal nerves. In one instance small

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ganglia associated with the communicating rami of the second thoracic nerve were found. According to his observations the ganglia associated with the communicating rami were distributed with no definite pattern. Most of them were located in gray communicating rami, or sympathetic roots, and certain ones appeared to be associated with white communicating rami close to the sites of their origin from the spinal nerves.

The present investigation includes detailed dissections of the sympathetic trunks and the communicating rami in human cadavers and microscopic examination of sections of communicating rami and of spinal nerves at the junctions of the communicating rami with them and particularly at the points at which the white communicating rami arise from the nerve roots. Some of the material prepared for microscopic study has been obtained at autopsy.

ANATOMIC AND HISTOLOGIC FINDINGS

The sympathetic trunks exhibit anatomic variations throughout their entire length. Those which occur in the upper thoracic and the lumbar segments are particularly significant in relation to sympathectomy. In the presence of a well developed stellate ganglion, the first thoracic segment frequently includes no grossly recognizable ganglion. Variations in the communicating rami in the upper thoracic segments often are associated with variations in the sympathetic trunk ganglia. In a high percentage of cases the second thoracic nerve gives rise near the origin of its white communicating ramus, to a ramus which joins the first. In a somewhat lesser percentage of cases the third thoracic nerve gives rise to a similar ramus which joins the second (Fig. 1).

These interconnecting rami constitute a pathway through which sympathetic postganglionic fibers, which arise in the sympathetic trunk ganglia in the second and the third or lower thoracic segments, may reach the brachial plexus without traversing the upper thoracic segments of the sympathetic trunk (Kuntz[3]; Kirgis and Kuntz[2]).

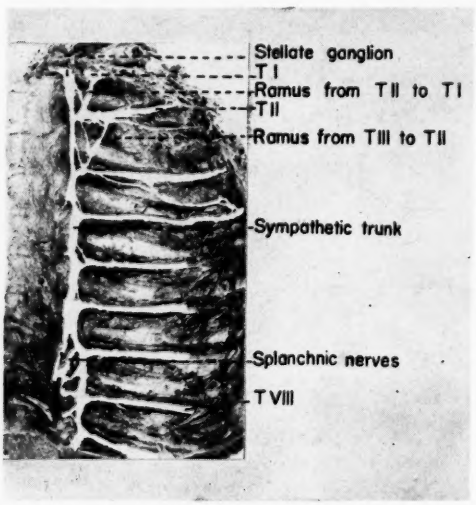

Fig. 1. Photograph of human dissection showing thoracic nerves, sympathetic trunk and communicating rami.

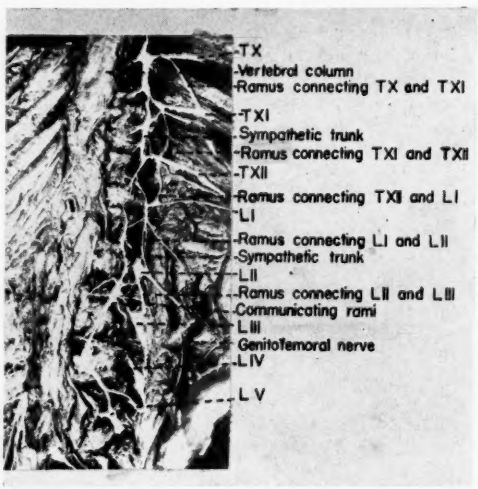

Fig. 2. Photograph of human dissection showing lower thoracic and lumbar nerves, conecting rami, sympathetic trunk and communicating rami, psoas muscle removed.

In the lumbar region the sympathetic trunk ganglia vary within a wide range both with respect to number and to position with reference to the vertebrae. Often there is no recognizable ganglion at the level of the first lumbar vertebra. The most constant one on both sides lies adjacent to the second lumbar vertebra but not always at the same level, and

in some instances it extends onto the body of the third lumbar vertebra. This is in agreement with the findings of Yaeger and Cowley.[9] The rami connected with the individual sympathetic trunk ganglia differ in numbers and with respect to their course direction. Some take transverse paths; some join the ganglion from a higher level; some join the ganglion from a lower level. Therefore most of them take oblique courses (Fig. 2).

Viewing the sympathetic trunks and the lumbar spinal nerves from the ventral aspect (after the psoas muscle has been completely removed) the sympathetic roots, or gray communicating rami, lie somewhat deeper than the white communicating rami. There is at least one sympathetic root for every spinal nerve. In the lumbar segments these roots are located in relation to the lumbar arteries. In some instances a sympathetic root divides into two rami which curve around the artery and reunite to form a single ramus which continues dorsad to join the spinal nerve medial to the origin of an oblique ramus. As Wrete observed, ganglia associated with communicating rami or with sympathetic roots may occur in all the lumbar segments.

In the present study, ganglion cell aggregates have been observed outside the sympathetic trunk ganglia in the cervical region, the first and the second thoracic, and the upper three lumbar segments. Only those which were imbedded in ventral nerve roots or which were located adjacent to ventral nerve roots have been studied in detail. They were usually located at or near the site of origin of a white communicating ramus. In a few instances such a ganglion could be detected macroscopically. Most of them could be observed only in histologic sections.

In the thoracic region ganglia imbedded in a ventral nerve root or lying adjacent to it have been observed only in the first and in the second thoracic segments. In some instances a ganglion located at the site of origin of the visceral ramus of this nerve could be detected macroscopically. In sections of such a ganglion taken parallel to the axis of the nerve, the ganglion cells appear to be closely aggregated, forming a compact mass lying in intimate contact with the ventral nerve root (Fig. 3A).

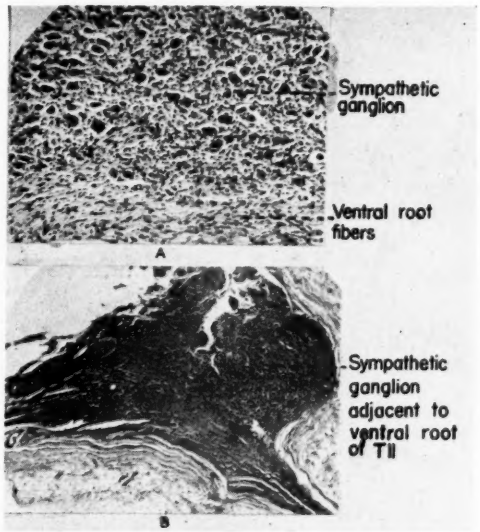

Fig. 3. A. Photomicrograph from a section of a sympathetic ganglion located adjacent to the ventral root of the second thoracic nerve. B. Photomicrograph (low magnification) of a section of the same ganglion, showing the entire section of the ganglion and its relation to ventral root fibers.

In one of these ganglia associated with the second thoracic nerve the number of ganglion cells, as indicated by cell counts, was found to be in excess of 20,000. Ventral root fibers could be traced directly into the ganglion. Also fibers which emerged from it, could be traced distalward in the nerve trunk (Fig. 3B). In this instance the second thoracic nerve undoubtedly included many sympathetic conduction pathways which did not traverse the sympathetic trunk, but which included synaptic connections in the ganglion associated with the ventral nerve root. Sympathetic pathways in the second thoracic nerve which are independent of the sympathetic trunk, (like those which traverse the sympathetic trunk) may lead into the brachial plexus through the ramus of this nerve which joins the first thoracic (Fig. 1). Similar direct sympathetic pathways in the first thoracic nerve may lead directly into the brachial plexus.

In the lumbar region sympathetic ganglia associated with the ventral spinal nerve roots have been observed only in the first and the

second lumbar segments. Most of them were small and could be observed only in sections. Just a few were large enough to be detected macroscopically. Some of the small ganglia were imbedded in the ventral nerve root usually near the site of origin of the white communicating ramus (Fig. 4), and some were located in the proximal portion of the white communicating ramus. In a number of instances a small ganglion was found imbedded in the ventral nerve root and a somewhat larger one was discovered located adjacent to the ventral root at the site of origin of the white communicating ramus.

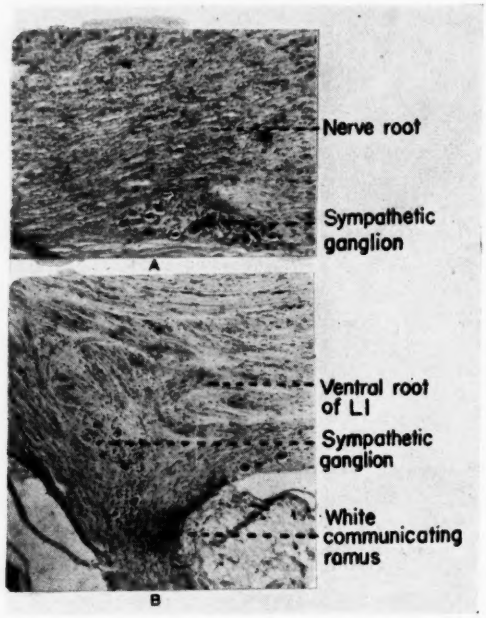

Fig. 4. A. Photomicrograph showing a small sympathetic ganglion imbedded in the ventral root of the second lumbar nerve. B. Photomicrograph showing a small sympathetic ganglion imbedded in the ventral root of the second lumbar nerve at the origin of the white communicating ramus.

Ganglion cell counts, in a limited number of individual ganglia imbedded in the ventral roots of the first and the second lumbar nerves, indicate a range of variation in numbers from approximately 160 to over 2,000. The ganglia located adjacent to the ventral nerve roots on the average were larger than those which were imbedded in the nerve roots. The largest ones were comparable in size to the largest ones observed in the first and the second thoracic segments.

In longitudinal sections of a lumbar nerve with a sympathetic ganglion imbedded in its ventral root, fibers may be traced into the ganglion from the proximal side. Fibers may also be traced distalward from the ganglion in the nerve trunk. These relationships favor the assumption that the ganglion cells are synaptically connected with preganglionic fibers which reach them directly via the ventral nerve root and in turn send their axons distalward in the nerve trunk. The axons of most of the ganglion cells located adjacent to a ventral nerve root seem to extend distalward in the nerve trunk. Most of the conduction pathways of which ganglion cells are imbedded in the nerve root or which are located adjacent to it constitute the distal links and are independent of the sympathetic trunk. The possibility that the axons of some ganglion cells, which are associated with a ventral nerve root, extend into the sympathetic trunk through the white communicating ramus is not precluded. Such fibers would traverse the sympathetic trunk and emerge in sympathetic roots.

In the lower thoracic and the upper lumbar segments, as in the upper thoracic segments, rami which interconnect adjacent spinal nerves convey both sympathetic and somatic fibers. From the eleventh thoracic nerve a slender ramus which arises near the communicating ramus may be traced to its junction with the twelfth thoracic nerve near the origin of a communicating ramus. Similar rami connect the twelfth thoracic and the first lumbar, the first and the second lumbar and the second and the third lumbar nerves (Fig. 2). These rami constitute pathways through which both sympathetic and somatic nerve fibers extend from one segmental nerve into an adjacent one. Those rami which connect the eleventh thoracic nerve with the twelfth, and the twelfth thoracic nerve with the first lumbar, may convey postganglionic sympathetic fibers from the lower thoracic into the upper lumbar segments. The presence of some intact sympathetic conduction pathways in the upper lum-

bar nerves following extirpation of the upper lumbar segments of the sympathetic trunk, leaving the thoracic segments intact, could be accounted for on this basis.

Rami connected with the first and the second lumbar nerves may transmit postganglionic fibers from the ganglia located in the ventral roots or at the points of origin of the white communicating rami of these nerves, when such ganglia are present, as well as fibers which arise in sympathetic trunk ganglia and reach these nerves through sympathetic roots. Nerves which have no ganglion cell aggregates associated with their ventral roots may include sympathetic conduction pathways which do not traverse the sympathetic trunk.

COMMENT

Sympathetic ganglion cells imbedded in ventral spinal nerve roots or located adjacent to nerve roots in relation to white communicating rami, undoubtedly represent cells which in their displacement from the neural tube, failed to reach the primordia of the sympathetic trunk ganglia. Those cells located in gray communicating rami, or sympathetic roots, are representative of those which have been displaced from the primordia of sympathetic trunk ganglia. The synaptic connections of ganglion cells located in relation to spinal nerve roots, or associated with the communicating rami must be determined primarily by their anatomic relationships. Those which are located in gray communicating rami, or sympathetic roots, undoubtedly are synaptically related to preganglionic fibers traversing the sympathetic trunk ganglion from which arises the gray ramus in question. Their axons join the spinal nerve with those in the same ramus which arise in the sympathetic trunk ganglion and have a similar distribution. Extirpation of the sympathetic trunk ganglion, consequently, would interrupt the conduction pathways of which they represent the peripheral links.

Ganglion cells which are located in a white communicating ramus are probably synaptically connected with preganglionic fibers which traverse the ramus to the points at which the ganglion cells are located. These preganglionic fibers may or may not extend into the sympathetic trunk. The axons of ganglion cells situated in a white communicating ramus may traverse the sympathetic trunk, or they may join the spinal nerve through the proximal portion of the white ramus and extend peripheralward in the nerve trunk. Ganglion cells, located in a ventral spinal nerve root or in close proximity to it, appear to be synaptically connected with preganglionic fibers which reach them directly through the ventral nerve root. Their axons do not traverse the sympathetic trunk but extend distalward in the spinal nerve (Fig. 5). The conduction pathways of which they constitute the peripheral links would not be interrupted by extirpation of the sympathetic trunk.

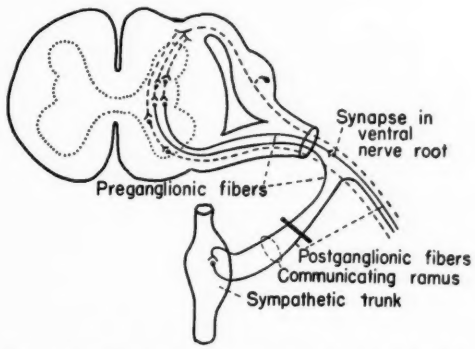

Fig. 5. Diagram to illustrate a sympathetic conduction pathway with synapse in a sympathetic trunk ganglion and one which is independent of the sympathetic trunk with synapse in the ventral nerve root.

The anatomic data outlined above demonstrate the existence in the first and the second thoracic and the first and the second lumbar nerves, in some human bodies, of sympathetic conduction pathways which are independent of the sympathetic trunk. They do not preclude the occurrence of such pathways in other spinal nerves. The functional significance of sympathetic pathways which do not traverse the sympathetic trunk and the frequency with which they occur is indicated by the number of failures to abolish sympathetic nerve activity in the corresponding areas of innervation by sympathetic ganglionectomy or section of the corresponding white communicating rami.

In a study of 140 patients, all of which had been subjected to extirpation of the lower thoracic and the upper lumbar segments of the sympathetic trunk or the upper lumbar segments alone, Ray and Console[5] demonstrated sympathetic nerve activity in the twelfth thoracic and the upper three lumbar dermatomes. Most of the patients had the sympathetic trunk removed from the eighth thoracic to the third lumbar segment. In 14 instances the entire sympathetic trunk had been removed, except in certain cases in which the sixth and the seventh thoracic ganglia were left in place for technical reasons. Some patients, particularly among those with extensive sympathectomy, gave evidence of residual sympathetic activity in cutaneous areas not included in the twelfth thoracic and the upper three lumbar dermatomes. In most of the individuals bursts of sympathetic activity could be demonstrated in the denervated area immediately after operation. Many showed no evidence of sympathetic activity immediately after sympathectomy in the areas affected, but sympathetic activity could be demonstrated after a few days or a few weeks.

On the basis of their findings, Ray and Console concluded that residual sympathetic pathways to the lower extremities remain intact following sympathetic trunk extirpation regardless of the extent of the excision. They did not demonstrate the anatomic relationships of these pathways, but pointed out that the residual sympathetic activity could be abolished by section of the ventral nerve roots, spinal anesthesia or paravertebral nerve blocking.

Intact sympathetic pathways following sympathetic trunk extirpation apparently are not limited to peripheral areas. On the basis of extensive experience with thoracolumbar sympathectomy for the relief of hypertension, Poppen and Lemmon[4] concluded that this procedure does not result in complete vasomotor denervation of the splanchnic area in most patients, even though the sympathetic trunks are removed from the third thoracic to the third lumbar segment.

The anatomic demonstration of sympathetic conduction pathways, which are independent of the sympathetic trunk, affords a more satisfactory explanation than formerly has been possible. For most failures to achieve complete sympathetic denervation in the affected areas by sympathectomy have been in cases where faulty operative technic can be ruled out. Sympathetic pathways involving synaptic connections in ventral nerve roots or in ganglia associated with the nerve roots do not traverse the sympathetic trunk, and are not interrupted either by sympathetic trunk extirpation or by preganglionic sympathectomy. These operations usually are undertaken and are interrupted by section of the corresponding ventral nerve roots. Resection of the ventral roots of the second and the third thoracic nerves, in conjunction with resection of the white communicating ramus of the first thoracic nerve and interruption of the sympathetic trunk below its connections with the third thoracic nerve, probably would guarantee complete sympathetic denervation of the upper extremity in some cases. To insure permanence of this result would require additional measures to prevent restoration of the interrupted conduction pathways by regeneration of the severed ventral root fibers.

Smithwick[7] described an operative procedure in which both roots of the second and the third thoracic nerves were divided and a segment of each nerve was removed—including the junctions of the communicating rami with the nerve. This procedure not only interrupts all the preganglionic fibers in the second and the third thoracic segments, but also removes the ganglion cells associated with the ventral roots of these nerves. Probably it would effectively prevent restoration of all pathways which include preganglionic fibers of the second and the third thoracic nerves.

Cases in which there is a ganglion associated with the ventral root of the first thoracic nerve, present a more difficult problem since section of this nerve would result in extensive motor paralysis. The residual sympathetic activity in the twelfth thoracic and the upper three lumbar dermatomes following sympathetic trunk extirpation, as pointed out by Ray and Console,[5] can be abolished by section of the ventral nerve roots, spinal anesthesia or paravertebral nerve blocking. Ganglion cells concerned in the direct sympathetic pathways in the lumbar region appear mainly in the first and second lumbar segments; in the

ventral roots of the first and second lumbar nerves; in addition to extirpation of the lower two thoracic and upper two lumbar segments of the sympathetic trunk and in most cases insures complete sympathetic denervation of the lower extremity.

Ventral root section in the lumbar region must be regarded as a drastic procedure even though the resulting limited motor paralysis is of little consequence. Measures also would be necessary to prevent regeneration of the divided ventral root fibers.

SUMMARY

Small ganglia located in communicating rami have been previously reported. Aggregates of sympathetic ganglion cells also lie imbedded in ventral spinal nerve roots and adjacent to nerve roots at the sites of origin of white communicating rami. These ganglion cells are synaptically connected with preganglionic fibers which reach them directly via the ventral nerve root. Most of them in turn send their axons distalward in the nerve trunk. In this manner sympathetic conduction pathways are formed which do not traverse the sympathetic trunk. They are not interrupted by sympathetic trunk extirpation or by section of the white communicating rami.

Ganglia in the ventral nerve root or located adjacent to the root have been observed mainly in the first and the second thoracic and the first and the second lumbar segments. Due to connecting rami between the upper thoracic nerves and between the eleventh thoracic to the third lumbar nerves, the distribution of the sympathetic conduction pathways which are independent of the sympathetic trunk is not limited to the segments in which the ganglion cells concerned are located.

Resection of the ventral roots of the second and the third thoracic nerves, in conjunction with resection of the white communicating ramus of the first thoracic nerve and interruption of the sympathetic trunk below its connections with the third thoracic nerve, probably would insure complete sympathetic denervation of the upper extremity in some cases. Resection of the ventral roots of the first and the second lumbar nerves, in conjunction with extirpation of the sympathetic trunk from the eleventh thoracic to the third lumbar segments, probably would insure complete sympathetic denervation of the lower extremity. In order to achieve permanent sympathetic denervation measures to prevent regeneration of the interrupted ventral root fibers would be necessary.

RIASSUNTO

L'A. ha precedentemente individuato dei piccoli gangli situati nei rami comunicanti. Accumuli di cellule ganglionari del simpatico sono stati ritrovati pure innicchiati nelle radici ventrali del midollo spinale ed in vicinanza alle radici nervose nei punti di origine dei rami comunicanti bianchi. Queste cellule ganglionari sono connesse-per sinapsi-con le fibre preganglioniche che le raggiungono direttamente attraverso le radici nervose ventrali. La maggioranza di queste cellule emettono a loro volta distalmente dei cilindrassi nei tronchi nervosi: in questo modo si creano delle vie di comunicazione simpatiche che non attraversano i tronchi del simpatico. Non vengono percio' interrotte con l'estirpazione dei tronchi simpatici o con la resezione dei rami comunicanti bianchi.

Gangli simpatici nelle radici nervose ventrali o in prossimita' delle radici stesse sono stati ritrovati principalmente nel primo e secondo segmento toracico e nel primo—secondo segmento lombare. Data l'esistenza di rami comunicanti tra i nervi toracici superiori a fra l'11° toracico ed il 3° nervo lombare, la distribuzione delle vie di conduzione del simpatico indipendenti dai tronchi del simpatico stesso non e' limitata ai segmenti nei quali le cellule ganglionari relative sono localizzate. Una completa simpatectomia degli arti superiori potrebbe essere raggiunta in taluni casi mediante la resezione delle radici ventrali del 2° e del 3° nervo toracico, in combinazione con la resezione del ramo comunicante bianco del 1° nervo toracico e l'interruzione del tronco simpatico al disotto delle sue connessioni con il 3° nervo toracico.

Una completa simpatectomia degli arti inferiori potrebbe essere invece raggiunta mediante resezione delle radici ventrali del 1° e del 2° nervo lombare, in combinazione con l'estirpazione del tronco sompatico dall'11° segmento toracico al 3° segmento lombare.

Per ottenere una completa e permanente denervazione simpatica degli arti occorrerebbe pero' istituire delle misure atte a prevenire una rigenerazione delle fibre nervose interrotte nelle radici ventrali.

SUMARIO

Hemos reportado en un articulo previo la presencia de pequenos ganglios en el curso de ciertas rami aferentes del gran simpatico. Estas pequenas colecciones de celulas ganglionarias se han encontrado tambien en la substancia de las raices motoras de ciertos nervios espinales o adyacentes a estas raices en el punto de origen de sus rami aferentes. Por el intermedio de estas neuronas ganglionarias existen connecciones entre el sistema nervioso central y la periferia que son independientes del tronco ganglionar del gran simpatico y que por lo tanto ne se destruyen con la reseccion de este tronco o de sus rami aferentes.

Los ganglios de las raices motoras o en su vecindad han sido observados principalmente en las raices correspondientes al primero y segundo segmento toracico y primero y segun do segmento lumbar. La existencia de rami communicantes entre los primeros nervios toracicos y entre el onceavo toracico y los tres primeros lumbares aumentan considerablemente la distribucion de estas conecciones simpaticas independientes del tronco ganglionar del gran simpatico.

La reseccion de las raices motoras del segundo y tercero nervio toracico y de la rama aferente communicante de este ultimo nervio en conjuncion con la interrupcion del tronco del gran simpatico en su nivel inferior al punto de origen de su rama afarente communicante con el tercer segmento toracico aseguran en ciertos casos la denervacion completa de las connecciones simpateticas del miembro superior correspondiente.

La reseccion de las raices anteriores de los primeros dos nervios lumbares en conjuncion con la extirpacion completa del tronco del gran simpatico en sus segmentos correspondientes a los ultimos dos toracicos y tres primeros lumbares aseguraran la denervacion completa de las connecciones simpateticas del miembro inferior correspondiente. En orden de obtener permanente la denervacion completa de todas las connecciones simpateticas de una region dada es necesario el usar ciertas medidas que prevengan la regeneracion de las raices que han sido interrumpidas.

SOMMAIRE

Les petits ganglions situés dans les ramaux communiquants sont connus. Les collections de cellules de ganglion sympathique se rencentrent dans les racines des nerfs spinaux ventraux et sont aussi adjacentes aux racines des nerfs à l'origine des ramaux communiquants blancs. Ces cellules ganglionnaires sont jointes par synapse à des fibres préganglioniques qui arrivent à elles directement par les racines ventrales des nerfs. La plupart envoient leurs axons par la périphérie par l'intermédeaire de tronc nerveux. De cette manière, des passages de conduite sympathiques sont formés qui ne traversent pas le tronc sympathique. Ils ne sont pas interrompus par l'extirpation du tronc sympathique ou par la section des ramaux communiquants blancs.

Les ganglions dans les racines ventrales du nerf ou situés proche de ces racines, ont été observés principalement dans le premier et second segments thoraciques et dans le premier et second segments lombaires. La distribution des conduits sympathiques qui sont indépendants du tronc sympathique, n'est pas limitée aux segments dans lequels les cellules ganglionnaires intéressées sont situées.

La résection des racines ventrales du second et troisième nerfs thoraciques, employée avec la résection des ramaux communiquants blancs du premier nerf thoracique et l'interruption du tronc sympathique après ses connections avec le troisième nerf thoracique, probablement assureraient une complète dénervation sympathique de l'extrémité supérieure dans beaucoup de cas. La résection des racines ventrales du premier et du second nerfs lombaires en conjonction avec l'extirpation du tronc sympathique allant du 11eme au 3eme segments lombaires, probablement assurerait une complète dénervation sympathique de l'extrêmité inférieure. Pour obtenir une dénervation permanente du sympathique, il serait nécessaire d'empêcher la régénération des fibres de la racine ventrale interrompre.

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Two Stage Pharyngo-Esophageal Diverticulectomy
Indications and Technic

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AND
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IN A PREVIOUS paper we described a method for handling pharyngo-esophageal diverticula by an original one stage operation. There are, however, certain diverticula of this region which do not lend themselves to this operation; and there are certain patients who, by reason of their poor reparative powers and general debility, are unsuited to an operation which requires excellent reparative powers and a good nutritional state to insure a low morbidity and mortality.

The size, arrangement, and condition of the diverticulum may indicate the need for performing a special two stage operation. When a large diverticulum distorts the structure from which it takes origin, it may interfere with the passage of a Levin tube into the stomach and make it impossible to feed the patient by gavage. In some instances, the distortion is so great, that almost everything the patient eats passes immediately into the diverticulum because the latter opening is in a more favorable position and is larger than that of the esophageal lumen which may be compressed by the distended sac (Fig. 1).

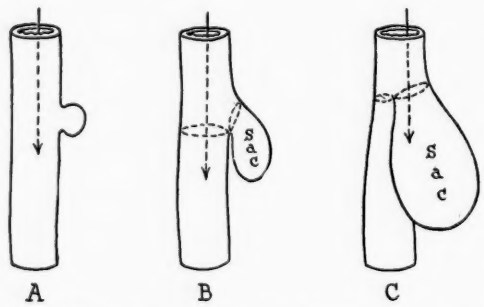

Fig. 1. Three stages in the development of a large pharyngo-esophageal diverticulum.

These large diverticula may even make it more difficult to design excision and closure so that accurate apposition can be obtained without distortion or stricture formation.

We also select for two stage operations those diverticula complicated by inflammation, ulceration and perforation. Not only do we prefer to do a two-stage procedure in these instances, but we believe that a one-stage diverticulectomy is contraindicated.

In the first stage of the two-stage operation for pharyngo-esophageal diverticulum, the sac is freed, brought out laterally and a diverticulopexy done. We employ silk sutures to keep the fundus of the diverticulum suspended high in the neck so that the fundus is on a higher level than the cricoid cartilage. The fundus of the sac is sewn to the deep cervical fascia anterior to the sternocleidomastoid muscle. This insures adequate emptying because the neck of the sac will be at a lower level than the fundus. To avoid fistula formation and serious infection, the silk sutures are inserted only in the submucosa of the sac. In one instance we observed a patient who developed an anaerobic infection caused by organisms carried by sutures which penetrated the mucosa of the sac. The infection spread in the tissues of the neck and face. The condition was ultimately brought under control but the patient's convalescence was considerably delayed.

To encourage the formation of a limiting plastic wall about the neck of the sac, we have found a small iodoform packing very useful. This packing is placed along the inferior margin of the diverticulum and extends from the lateral edge of the esophagus to the skin edges where it is brought out and transfixed with a small safety pin (Fig. 2). This packing is left in place for about five days. Along the line of the packing, adhesions are

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formed between the sac and the surrounding structures. These adhesions, along with the anchoring sutures, prevent the sac from descending into its original position. If it has been impossible before fixation of the sac in the neck to pass a Levin tube down the esophagus, it can now be done in practically every instance.

CASE REPORT

I. J., age 79, farmer, and father of a professional colleague. He was first admitted to Wesley Memorial hospital, August 3, 1937. He said that for 10 years he had been conscious of increasing difficulty in swallowing. He lived on a farm rather remote from medical service and it was not until loss of weight and weakness handicapped him in his

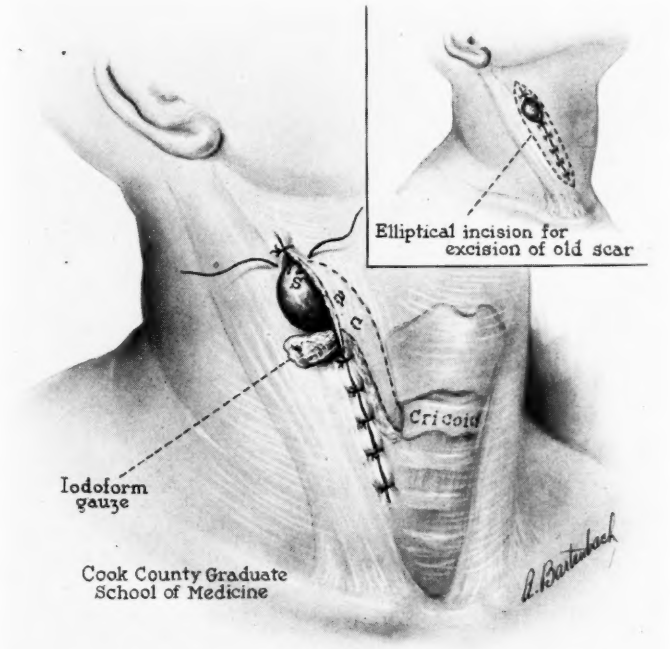

Fig. 2. The position of the diverticulum in the neck after it has been anchored in the upper angle of the incision. A stitch is shown transfixing the submucosa of the fundus of the sac. Dotted line illustrates excision of old scar at beginning of second stage of operation.

After a period of two or more weeks, if the patient's nutritional balance has been restored and his physical condition warrants it, the second stage of the operation may be undertaken. While it is true that most diverticula can be resected within the first month following their suspension in the neck, we have had patients who have gone as long as one year before they found it convenient to return for the second stage of the operation. The following case will serve to illustrate this point.

work that he decided to consult his son about his ailment. He stated that when he began to eat he felt all right but after a few minutes, there was a progressively increasing discomfort which terminated in complete inability to swallow more liquid or solid food. When this stage was reached, he massaged his neck and was able to evacuate a rather large quantity of food into the mouth, which he immediately removed.

When the patient presented himself at the hospital, he had already lost 20 pounds and was so weak he could barely stand alone. It was of special interest to learn that the patient's father had died

from starvation because of a 'similar' condition. The advanced age of the patient and the fact that he was on the point of collapse from starvation led us to adopt a conservative procedure. The following day, after a preliminary injection of morphine sulphate gr. 1/6 and scopolamine gr. 1/150, the right side of the neck was infiltrated with one percent novocaine. An incision was made along the anterior border of the sternocleidomastoid muscle, about one inch above and one and one-half inches below the level of the cricoid. The sac was brought into the field, and a strip of iodoform gauze was inserted along the inferior surface of the sac. The entire sac was lifted up above the level of the cricoid cartilage to minimize the possibility of its being filled with material which he subsequently took by mouth. The protruding portion of the sac shrank rather rapidly and the wound healed after the iodoform gauze was removed on the fourth day. In this particular instance, no stitches were placed in the fundus of the sac to fix it in the wound.

On the evening following the operation the patient sat up in a chair and was permitted to swallow some sweetened tea. During his stay in the hospital, he was able to take a gradually increasing amount of fluid. When he left the hospital fifteen days later, he was eating liberal quantities of soft food without distress.

For eight months the patient continued to gain weight and strength. Toward the end of this time he experienced a recurrence of difficulty in swallowing, and though it was not as marked as formerly, it annoyed him. Since he had now gained more than his original weight loss, it was considered advisable for him to return to the hospital for a check-up. X-ray examination showed that the sac had gradually retracted back into the neck, but had not assumed the proportions showed before the first operation.

On June 23, 1938, he was readmitted to the hospital and the following day the old scar was excised under local anesthesia. The diverticulum was dissected out and the opening in the esophagus sutured with fine black silk. The wound was left open with no drain and no sutures. Recovery was uneventful and he was discharged in excellent condition. A recent examination of the patient showed no remnant of his diverticulum.

When heard from on March 8, 1946, he reported that he was in excellent health and had no difficulty in swallowing. He is now 87 years old.

It is surprising how greatly large diverticula will shrink when they are fixed in the neck and are no longer subject to distention by solid food and fluids. The method we employ in the second stage of the operation is identical with the original one stage pharyngo-esophageal diverticulectomy previously described by us.

METHOD

1. The old scar is excised with an elliptical incision, being careful not to cut into the fundus of the diverticulum (Fig. 2).

2. The fascia along the anterior border of the muscle is divided and the muscle retracted laterally exposing the carotid sheath.

3. The lateral border of the thyroid gland is exposed and its margin clearly defined.

4. The carotid sheath, its vessels and nerve, are retracted laterally by a ribbon retractor. The thyroid gland and its underlying larynx and trachea are retracted medialward (Fig. 3B).

5. The loose areolar tissue between thyroid and the carotid sheath supports the inferior thyroid artery which usually should be ligated and divided (Fig. 3B).

6. If the lateral margin of the esophagus is now identified, the position of the diverticulum can be established by remembering that its neck is at the level of the cricoid cartilage and its fundus extends downward between the posterior wall of the esophagus and the anterior surface of the prevertebral fascia (Fig. 3).

7. Careful traction on the wall of the diverticulum with a Babcock (or similar non-traumatizing forceps) will bring the sac into the more superficial regions of the incision where its size and conformation can be clearly studied.

8. The neck of the sac now is clearly exposed and by lifting gently it will be found that it is possible to rotate the pharyngo-esophageal area into direct vision. The extent of the rotation of the esophagus and trachea around the longitudinal axis of these structures has been studied in the living and fresh postmortem specimens. It is found that with moderate tension this rotation amounts to between 45 and 90 degrees. The maneuver will bring the neck of the sac into a completely visible and accessible position. The recurrent laryngeal nerves are not rendered more vulnerable by this rotation; on the contrary this maneuver permits a better view of the proximal nerve and the distal one is

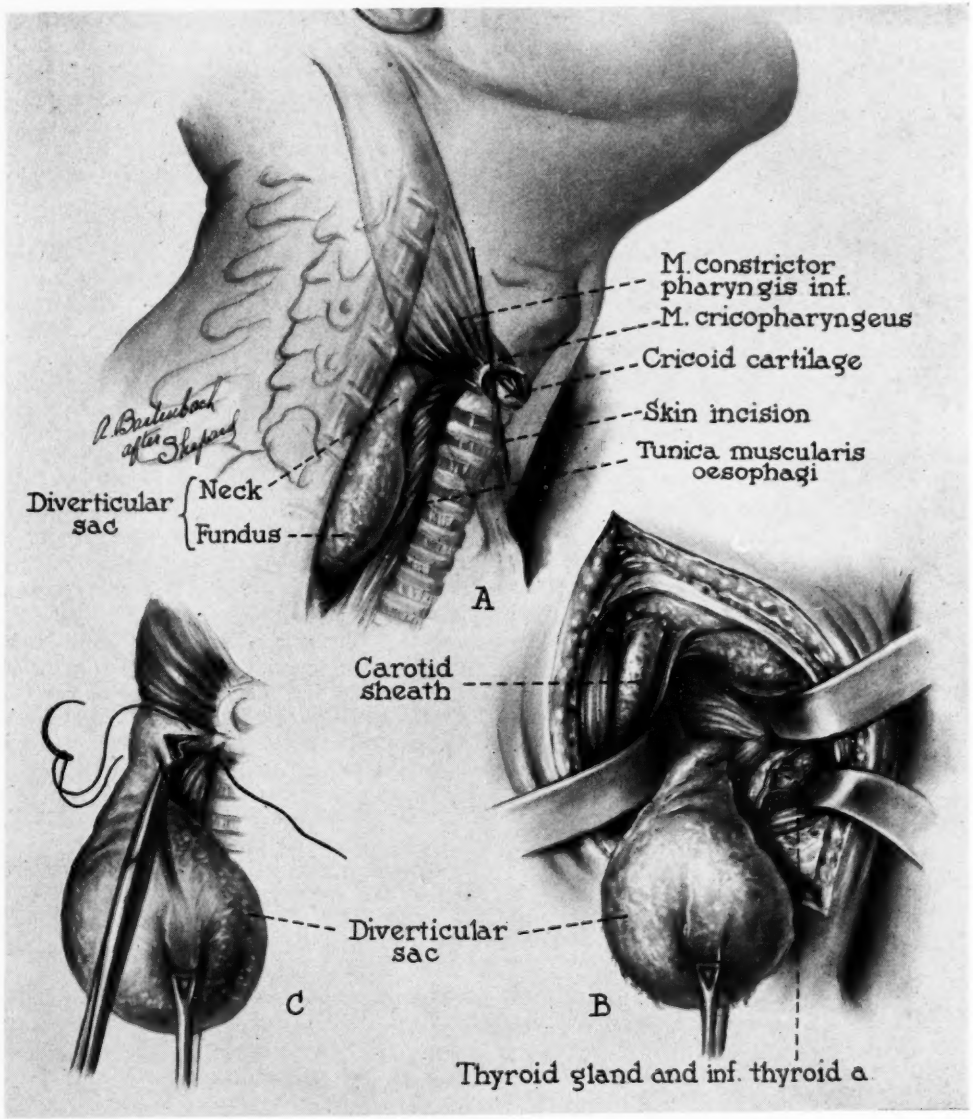

Fig. 3. Position of sac and its relation to neighboring structures.

not drawn into the field of danger (Fig. 4A, B).

9. The muscle fibers of the boundaries of the neck of the diverticulum are now clearly separated from the sac wall with maneuvers which will preserve as many of them as possible because they can be utilized subsequently to reinforce the suture line of the repaired defect.

10. It is important that the proximity of the inferior recurrent laryngeal nerves be kept in mind (Fig. 5A, B, C).

11. After a careful survey of the neck of the sac a point is selected at its lateral margin on a level with the cricoid cartilage and a fine forceps is applied transversely. A knife is used to divide the tissue proximal to the jaws of the forceps. This will make the initial opening into the esophagus (Fig. 5A). This opening is now sutured with one or more interrupted fine silk sutures. A second forceps is now applied just beyond the first forceps, being sure to continue at the same level and to maintain the same transverse character of the division. As subsequent forceps are applied and the tissue divided proximally to them, the opening in the esophagus is sutured by carefully spaced interrupted sutures until the entire diverticulum has been severed from the pharyngo-esophageal junction.

This rather methodical clamping, division, and suturing, results in a secure closure of the defect in the esophagus without the danger of undue narrowing and constriction and without leaving crushed and devitalized tissue in the grasp of the sutures. The well-spaced interrupted sutures bring the mucosa into intimate apposition and secure the holding submucosal layer against separation by their distribution of the tension evenly across the posterior wall of the viscus. The diverticulum has been detached from its base in a transverse diameter so that postoperative stricture formation is greatly lessened (Fig. 5).

12. The muscle fibers of the cricopharyngeus and the uppermost fibers of the esophagus are now drawn over the first suture line with interrupted sutures (Fig. 5A).

13. A small soft rubber drain may be inserted down to the lateral margin of the thyroid gland to provide a pathway along which blood or serum may escape. It will likewise form a pathway of easy exitus for any leakage, should it occur. *In no instance should the wick be carried down to the immediate vicinity of the suture line where it would inhibit the reparative processes by carrying away the plastic exudate from the suture line.*

POSTOPERATIVE CARE

If a Levin tube could be passed before the first stage of the operation, it has been our practice to leave it in place after the diverticulopexy. This is useful in poorly nourished debilitated patients and offers a means for immediate introduction of fluids into the stomach. If any considerable difficulty is encountered in the introduction of the Levin tube, it has been found that the patients can usually swallow enough food to sustain themselves; and most of them will improve their nutritional state rapidly. It is an advantage

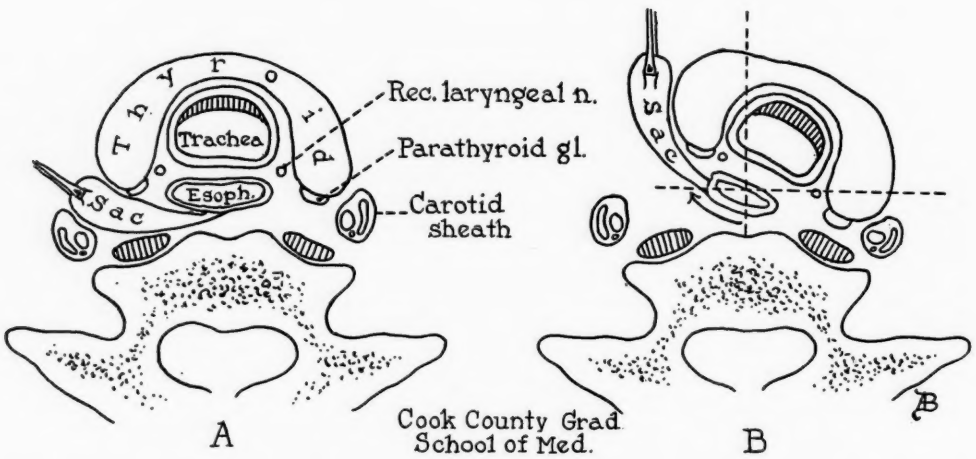

Fig. 4. The mobility of esophagus and diverticulum is diagrammatically illustrated.

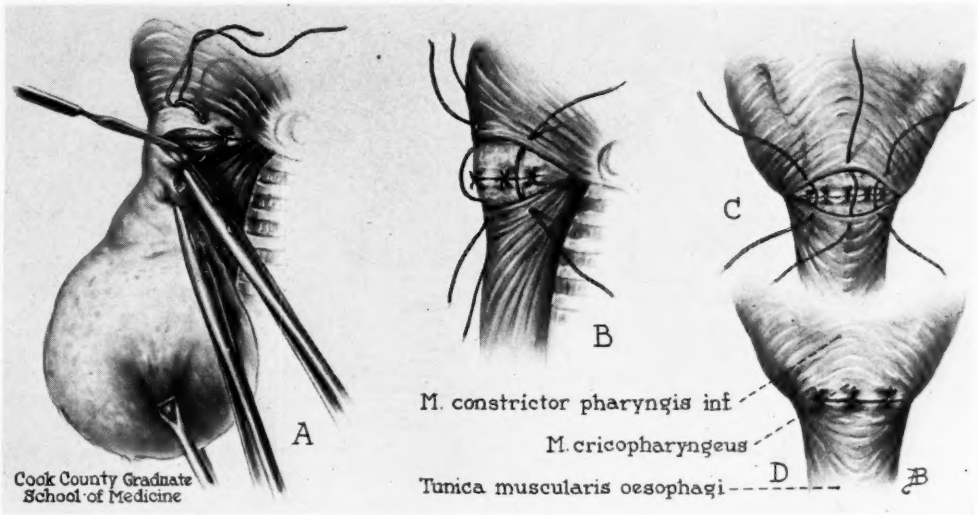

Fig. 5. This drawing shows: A. Method of transverse division of sac and application of interrupted sutures. B. C. and D. illustrate the completed suturing of the transverse division of the neck of the diverticulum; reinforcing sutures through the muscle fibers of cricopharyngeus and muscle fibers of esophagus are also shown.

to have a Levin tube in the stomach before the second stage of the operation is done. Feeding following the first stage can be pushed as rapidly as the patient can manage. After the second stage of the operation, all food and fluids by mouth should be withheld for at least eight to 10 days. During this interval, the patient is supported by daily administration of glucose and salt solution and in some instances supplemented by amino acids, plasma, and whole blood transfusions.

The use of vitamins is exceedingly helpful in restoring the patient's resistance and reparative powers. Vitamin C is given in 1000 mgm. dose daily. This amount is introduced slowly along with the glucose and salt solutions. Vitamin B complex is also given in the infusions. In patients who show any evidence of prolonged bleeding time we have routinely administered Vitamin K in doses of 10 mgm. by hypodermic and 5 mgm. every other day until the prothrombin time is within normal range. At the end of the eight to 10 days the Levin tube is removed and the patient is started on our regular postoperative gastrointestinal diet, which is as follows:

10th and 11th Postoperative Day:

15 feedings, 1 oz. maximum q. hourly.
- a) Hot water and tea in teaspoonful amounts and if tolerated increased to 1 oz. q. hourly.
- b) Sugar sweetened tea; cooked fruit juice; milk-mixture.

12th to 16th Postoperative Day:

15 feedings, 2 oz. maximum q. hourly.
- a) To above foods may be added 2 egg whites.
- b) Later, 1 egg daily; soft boiled, poached or coddled.
- c) Cereal (cooked).
- d) Add another egg—on 15th and 16th day (2 daily).

16th to 20th Postoperative Day:

8 feedings, 4 oz. maximum q. 2 hours.
- a) Add another egg (now 3 daily) may be served as omelet or creamed.
- b) Beverages.
- c) Another serving of cooked cereal daily.
- d) Ice cream, custard, and jello may be substituted for milk or milk-mixture.

After the first 10 days of the gastrointestinal diet, highly concentrated and nutritious soft foods are permitted. The patient is encouraged to swallow small amounts and eat slowly.

From the 20th to the 30th day postoperatively the patient is permitted to increase slowly the amounts and diversity of his diet and after the month period following the operation no restrictions on his diet are maintained.

SUMMARY

Indications for and the technic of a two stage pharyngo-esophageal diverticulectomy have been presented. The details of the pre- and postoperative management are suggested and their importance emphasized. It is our impression that early encouragement of food taking is one of the commonest causes of leakage and fistula formation. If adequate advantage is taken of the ingenious methods of substitution of parenteral feeding and fluid administration there will be little urgent need of early oral intake.

We have never found it necessary to dilate the esophagus following either a one or two stage operation which may be attributed to many factors but principally to the transverse character of the resection and the use of interrupted sutures of nontraumatized or crushed structures.

RIASSUNTO

Discussione sopra le indicazioni e la tecnica della diverticolectomia.

Speciale importanza viene attribuita alle cure pre- e postoperatorie.

L'A. ritiene che una troppo precoce alimentazione per via orale sia la causa piu' comune di infiltazioni e di fistole. Questo pericolo puo' essere facilmente eliminato facendo appello all'alimentazione per via parenterale. L'A. non ha mai dovuto ricorrere ad una dilatazione dell'esofago dopo un'operazione in una o due tappe: attribuisce questo fatto principalmente alla resezione in senso trasversale ed all'uso di suture a punti staccati di tessuti non traumatizzati.

SUMARIO

Se presentan las indicaciones y la tecnica en dos etapas de la diverticulectomia faringo-esofagica. Se presenta en detalle, el tratamiento pre y post-operatorio. Es nuestra opinion que la alimentacion por via oral muy tempranamente es la causa mascomun en la produccion de la fistula post-operatoria; esta se puede evitar si se toma ventaja de los numerosos metodos injeniosos a disposicion del cirujano que existen hoy en dia en la alimentacion del paciente por las diferentes vias parenterales.

En nuestra experiencia nunca ha sido necesaria la dilatacion del esofago subsecuente a la diverticulectomia y atribuimos esto a varios factores, pero principalmente a la reseccion transversal, al uso de suturas interrumpidas atraumaticas, y al cuidado que tomamos de no traumatizar los tejidos.

SOMMAIRE

Les indications et la technique de la diverticulestomie pharyngoeosophagéalle en deux temps sont discutées.

Les soins préopératoires et postopératoires donnés aux malades sont énumérés et leur importance est discutée en détail. L'auteur a l'impression que l'alimentation précoce du malade est une des causes principales de fuites et de formation de fistules. Si on a recours aux différentes méthodes d'alimentation parentérale et à l'administration d'eau en quantité suffisante l'emploi urgent d'alimentation orale n'est pas fréquent. Il ne nous a jamais été nécessaire de dilater l'oesophage dans l'opération en un ou deux temps et nous attribuons nos succès à ce que nous employons la résection transversale et aussi la suture en points interrompus de materiels qui ne traumatisent pas et qui n'écrasent pas les tissus.

Labyrinthine Surgery for Ménière's Disease

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MÉNIÈRE'S disease is characterized by recurring attacks of vertigo, along with auditory symptoms of a distinctive type. The inner ear pathology, which causes these disturbances, is now known to be a hydrops of the labyrinth. The type of hydrops found in this condition differs essentially from that commonly found in inflammatory inner ear disease but the etiology is indefinite and therefore it is called "idiopathic hydrops." The most favored theory as to the etiology is—a disturbance in the secretory apparatus leads to oversecretion of endolymph.

The most predominating symptom of this disease, and the one which causes greatest disability, is the recurring vertigo. The most consistent symptom, and the one which is necessary for diagnosis, is the loss of hearing which begins as a low tone inner ear impairment. Other auditory symptoms which vary greatly but may be so severe as to be of great subjective concern are low-pitched tinnitus, a sense of blockage in the ear and a disagreeable disturbance of the quality of the tone, usually a diplacusis. The auditory symptoms fluctuate in severity and the threshold varies widely from time to time, but the loss tends to become progressively greater.

The diagnosis is usually made when both auditory symptoms and vertigo are present. In the infrequent case however it is possible to make the diagnosis on the basis of the characteristic nature of the auditory symptoms without the presence of vertigo.

The use of surgery in the treatment of the disease has been directed primarily at the prevention of vertigo. Although this has been consistently accomplished by a number of methods, no treatment can be considered wholly satisfactory unless the effect on the auditory apparatus is also favorable.

In view of the nature of the pathologic lesion in the ear, surgery cannot be expected to cause any great improvement in hearing. Also, since the disagreeable tinnitus and diplacusis probably take origin from the same cause as the hearing loss, it is unlikely that surgery can relieve them without destroying auditory function.

At the present time surgery is used as a last resort in those cases which have not been sufficiently helped by medical therapy. The percentage of such cases varies according to different reports, but would appear to be somewhere between ten and twenty.

Ménière's disease is a unilateral process in approximately ninety percent. When bilateral the time of onset in the second ear varies. It may be soon or not until four or five years after the first. The hearing loss may be about equal or may continue to be greater in the originally involved ear.

In the bilateral case a surgical procedure that may destroy hearing is unsuitable, except in the cases where the symptoms can be definitely ascribed to the ear with much the poorer function.

In the unilateral case the preservation of the remaining hearing is usually of little service to the patient except as a reserve that might be used in case of injury to, or similar involvement of the other ear. This latter possibility is of sufficient importance to warrant a search for a surgical procedure which might permit selective destruction of the vestibular function by the relatively safe intralabyrinthine route.

Intracranial division of the vestibular fibres of the eighth nerve, first performed by McKenzie[1] and strongly recommended by Dandy[2] preserves auditory function. The method has given excellent results but falls short of an ideal treatment in that the process in the inner ear is probably not impeded or influenced, also that the intracranial approach may carry some operative risk if not expertly carried out.

* Division of Otolaryngology of the University of Chicago. Read before the Thirteenth National Assembly, United States Chapter, International College of Surgeons, St. Louis, Nov. 15-20, 1948.

LABYRINTHINE SURGERY

Surgical procedures on the labyrinth have attracted much attention because of the simplicity with which they can be carried out and the absence of operative risk.

PORTMANN'S OPERATION:[3] DRAINAGE OF THE SACCUS ENDOLYMPHATICUS

Portmann's operation consisting of drainage of the saccus endolymphaticus was conceived before the pathological process was known. The discovery by Hallpike and Cairns[4] of a hydrops of the labyrinth in Ménière's disease appeared to strengthen Portmann's thesis that drainage of the saccus was a logical procedure. Portmann reported good results but the experience of others in smaller numbers of cases has been less favorable and the method is not in general use.

EXPERIMENTS ON THE SACCUS AND DUCTUS ENDOLYMPHATICUS

In order to demonstrate the effect of simple drainage of the saccus and ductus endolymphaticus, and also to obtain experimental evidence regarding the function of these structures in the maintenance of the volume of endolymph a series of experiments was done in the monkey. These consisted of both simple drainage of the saccus and various degrees of destruction of the ductus endolymphaticus.[5] In three ears the saccus and medial convoluted part of the ductus, described as Sinus ii by Anson and Wilson,[6] were completely destroyed. After a period of between three and one-half and four months, the defect was completely filled in by new bone and marrow, but the remainder of the endolymphatic system and the sensory organs showed no histological variation from the normal.

The conclusion seemed warranted from these experiments that the maintenance of a normal volume of endolymph is not dependent upon a functioning ductus endolymphaticus or even upon its existence. Also the occurrence of a hydrops or Ménière's disease can not be attributed to interference with normal absorption of endolymph from its dilated and convoluted middle portion.

Moreover, it was demonstrated clearly that drainage and partial destruction of the saccus was followed by sealing off and healing of the defect without any demonstrable effect on the labyrinth beyond.

Any effect of Portmann's operation on Ménière's disease would be of relatively brief duration.

ALCOHOL INJECTION

The injection of alcohol into the labyrinth has been used chiefly in England. Mollison[7] opened the external semicircular canal and injected three minims of absolute alcohol after first withdrawing a similar amount of perilymph. Reports by him and also by Wright[8] and McDowall[9] who used the same method have been favorable as regards prevention of vertigo although not completely successful. Deafness followed in all cases. Tinnitus has however remained undiminished in as many as one-third of the latter's cases.

Ablation of a Membranous Semicircular Canal: Removal of a part of the membranous horizontal semicircular canal has sometimes occurred accidentally during the fenestration procedure for otosclerosis, usually during a revision. Personal experience in two such cases was that a further loss of hearing occurred postoperatively, and the fistula response was negative. This was followed in several weeks by a return of hearing to the preoperative level for speech frequencies. The fistula response never became positive.

Although reports are lacking in the literature, personal communications indicate that the experience of others has been similar in at least some of their cases. There is evidence that removal of part of the membranous canal, without its ampullary end, destroys function of that canal but does not destroy hearing in at least many of the cases.

In the fenestrated monkey's ear destruction and obliteration of one canal produces no histologic change in the vestibule or in the auditory apparatus.

Cawthorne[10] has treated a large number of cases of Ménierè's disease by removal of the ampullary end of the membranous horizontal canal apparently along with its ampulla.

Consistently he has reported good results in preventing attacks of vertigo but all cases were reported to be deaf in the operated ear.

It would seem that these results in Ménière's

disease do not correspond to the experience with otosclerotics. Also the histologic findings in the monkey's ear suggest that if the injury is limited to the canal and its ampulla the auditory apparatus escapes injury.

Coagulation of the Labyrinth: Coagulation of the horizontal membranous canal, ampulla and the vestibule through a small fistula near the ampulla in cases of Ménière's disease was first reported by Day.[11] His results in preventing further attacks of vertigo have been uniformly good. He reported relief of tinnitus in nearly all cases and a preservation of useful hearing in approximately 10 percent. He has had no complications from the operation. McNally[12] has reported one case in which there was a facial palsy for several months following coagulation thereby indicating that the facial nerve is not completely free from the danger of injury.

The experience of others, for example Sullivan—as reported by Ireland,[13] who used the coagulation procedure in the vestibule, discovered that profound deafness followed without exception.

The explanation of Day's more favorable experience suggests the possibility of some variation in technic, such as his stated practice of withdrawing the coagulating tip slightly after it has impinged on the wall of the vestibule, before applying the current.

The author's experience with the coagulation procedure in Ménière's disease has been limited to eight cases. In most cases the coagulation was limited to the membranous horizontal canal and its ampulla, but was sufficiently strong and repeated so as to destroy these structures. In some, the coagulation undoubtedly involved the utricle.

In one case the coagulation was applied to two canals at approximately a maximum distance from the ampullas. In all cases the hearing loss was increased to the point where no definite hearing could be demonstrated although it was tested over long periods of time.

Prevention of attacks of vertigo was accomplished in five cases. One case could not be followed up, and two cases developed occasional mild vertigo which was apparently caused by the opposite ear.

In some patients there was intermittent low-pitched tinnitus after several months had elapsed. Along with it there was a sense of blockage in the ear which, although not as severe as before operation, was sufficient to cause some apprehension that it might be followed by an attack of vertigo.

Discussion: When the results of Day's cases are combined with those of others who have used the coagulation procedure, and the experience with coagulation limited to the canals and ampullas only, it would appear that preservation of hearing can be anticipated only occasionally—or at most—in a small minority of such cases.

The coagulation procedure has been successful as a means of preventing attacks of vertigo and subjectively has been a satisfactory treatment. In most cases the further loss of hearing causes no disability, but it is of sufficient importance to limit this form of surgical therapy to a relatively small percentage of cases. An intralabyrinthine surgical procedure which would consistently preserve hearing while preventing vertigo would undoubtedly become a treatment of choice in a much larger group.

ANIMAL EXPERIMENTS ON COAGULATION AND INTRALABYRINTHINE NERVE INJURIES

A series of experiments on the rabbit's ear (done in our laboratory by Dr. Bruce Proctor before penicillin was available—but not reported) showed that instrumentation within the vestibule, in the attempt to rupture or injure the utricle, resulted in: extensive fibrosis in the perilymphatic spaces, varying degrees of hydrops, and degeneration of sensory organs. These results, along with early experiences with operations on the human ear, led to further experiments to determine the extent to which the vestibular apparatus might be injured by coagulation or instrumentation without causing histologic changes in the auditory sense organ. More recently the effects of the use of the coagulating current within the vestibule have been demonstrated by Schall and Tom Rambo.[15] These men have confirmed the improbability of preserving hearing in more than a minority of cases when treated by coagulation within the vestibule.

The following experiments were done on the monkey's ear during the past several years to

determine their effect on the histologic appearance of the auditory sense organ: coagulation of the ampulla of the horizontal canal, coagulation of all canals at maximum distance from the vestibule, injury to the nerves to the horizontal canal ampulla and to the utricle. In one case there was detachment of the otolithic membrane of the utricle. The introduction of the coagulating tip and the use of current was not strong enough to cause bubbling or visible changes, although sufficiently strong enough to produce a facial nerve stimulus.

All ears were prepared and examined histologically. In practically all cases histologic evidence of the injury to the vestibular apparatus was shown. It was found that in no case had the injury resulted in any extensive change, or fibrosis in the perilymphatic space of the vestibule.

In one animal sacrificed within 24 hours of coagulation, there were collections of red blood cells in the perilymphatic spaces and an altered staining reaction of the perilymph. In all the others sacrificed, there was no evidence of hemorrhage after several days or weeks.

The procedures consisting of limited instrumental injury to the ampullary nerve and utricle, or coagulation to the canals and ampullas caused no histologic change in the auditory apparatus. In no case was there more than a minimal amount of fibrous tissue in the perilymphatic cistern.

In the ear, which was fixed within 24 hours after the coagulation, there was some suggestion of a chemical change in the perilymph as indicated by the altered staining reaction.

The histologic findings in these ears failed to provide an explanation for the profound loss of hearing which occurred in humans where the coagulation procedure only had been limited to canals or their ampullas.

SIMPLE FENESTRATION, DECOMPRESSION OF PERILYMPH, INTRALABYRINTHINE NERVE INJURIES

In the search for a method to prevent vertigo while preserving cochlear function, several procedures were carried out on humans with intractable Ménière's disease.

Case 1: G. R., male, age 40. Advanced unilateral Ménière's disease unrelieved by medical therapy. Serious disability from vertigo and average hearing loss of over 60 Db in speech frequencies. This patient had a previously healed radical mastoid cavity. On July 15, 1940, a fenestra was made near the horizontal canal ampulla and a barbed dental broach passed through the ampullary nerve into the vestibule in an anterior direction until it impinged on the opposite wall and then was withdrawn. This was repeated. No bleeding or visible injury to the membranous canal or its ampulla was observed despite the use of the barbed instrument. The fenestra was covered with a skin flap. The hearing in the ear was further impaired to a state of profound deafness. Vertigo was relieved except for mild recurrences on infrequent occasions but no longer caused any disability.

Although the ear was profoundly deaf, tinnitus and a sense of blockage of mild degree have been intermittently present. The fistula response has remained active and the fenestra is visible through the thin covering skin. The response to cold caloric stimulation with ice water was absent two months following operation but since that time, it has become active to an approximately normal degree. There has been no Tullio phenomenon.

Case 2: E. B., female, age 32. Unilateral Ménière's disease for three years, unrelieved by medical therapy. Fluctuating hearing threshold averaging about a 40 Db loss for speech frequencies. On April 3, 1945, a simple mastoidectomy was done and a fenestra made in the horizontal canal near the ampulla. An unbarbed dental broach was passed anteriorly through the nerve to the ampulla until it impinged on the wall of the vestibule in the attempt to damage the nerve to the utricle. This was repeated. There was no visible injury to the membranous canal or ampulla and no hemorrhage.

The middle ear conducting apparatus was avoided entirely. No covering was applied to the fenestra. A few sulfathiazole crystals were sprinkled in the cavity and the wound closed. Penicillin was given for several days.

The wound healed by first intention. Afterwards deafness was found to be profound in the operated ear. The fistula response remained strongly active. On pressure—strenuous noseblowing and sneezing resulted. A Tullio[14] reaction was present on exposure to loud sounds or noises, and caused great annoyance. Although the ear was deaf, an intermittent sense of blockage and tinnitus persisted. While the fistula response was strongly active, the cold caloric response was found to be diminished with the head at 60 degrees backwards. Attacks of vertigo were infrequent but of sufficient severity that a secondary operation was done on June 12, 1946. This date was over fourteen months after

the first operation. At this time the mastoid cavity was found to consist of one large air cell, the lining mucoperiosteum of which formed the covering of the fenestra. The fenestra was widely open.

The membranous canal and ampulla were then destroyed by coagulation. The coagulating tip extended slightly into the vestibule.

After operation vertigo was moderate—receding gradually over several weeks. No further attacks of vertigo had occurred when last observed several months after operation.

Case 3: E. M. H., male, age 55. Unilateral Ménière's disease for two years, which had resisted medical therapy and was a serious hazard for his occupation of railroad switchman. There was an average hearing threshold loss of about 35 Db for speech frequencies.

On May 12, 1945, a simple mastoidectomy was done. A fenestra was made as in case 2 with a similar attempt to injure the nerves to the horizontal canal ampulla and utricle. The wound was closed in a similar manner with no covering being placed over the fistula. Sulfathiazole crystals were dusted into the wound and penicillin given parenterally postoperatively. Recovery was rapid. The ear was profoundly deaf after operation and has remained so until the present time. There is still a slight hissing type of tinnitus in the ear but the severe noises have been relieved. An active Tullio phenomenon[14] has been present since operation and is activated by such sudden sounds as steam hissing from a locomotive, grinding of car wheels, and ringing of an engine's bell.

The fistula response remains strongly positive on pressure over the mastoid scar. There have been occasional mild attacks of dizziness but the patient considered himself sufficiently relieved to remove the hazard and he wished no further treatment.

Case 4: J. B., male, age 51. Ménière's disease in the right ear of about twenty years' duration with threshold hearing loss of over 60 Db for speech frequencies. He also had a threshold hearing loss in the left ear which was less marked but which showed wide fluctuations for speech frequencies. Although the patient referred most of his complaints to the more impaired ear, a diagnosis of early Ménière's disease in the better ear seemed indicated as well.

For the purpose of obtaining further information, a two stage operation of the more impaired ear was decided upon. On October 11, 1946, a simple mastoidectomy was done as in cases 2 and 3. There was no mastoid pneumatization but a moderately large antrum was found. A simple fenestra was made without injuring the membranous labyrinth and without attempting any interference within the bony labyrinth. No covering was placed over the fenestra. The wound was closed after dusting in a few sulfathiazole crystals. Penicillin was given for several days.

Recovery from the operation was rapid. The ear, which had about 60 Db threshold loss for speech frequencies before operation, was totally deaf to a loud shout and to the audiometer thereafter when the opposite ear was masked.

An active fistula response persisted, as well as annoying vertigo whenever he was close to loud noises (Tullio phenomenon). The tinnitus was not relieved. Attacks of vertigo persisted, as well as that which occurred because of the open fistula. Seven months after the first operation the wound was reopened for inspection of the fenestra and coagulation of the membranous labyrinth. Again the antrum was pneumatized and the fenestra was found to be widely open and covered by the semitransparent mucoperiosteum. The canal and ampulla were then coagulated. The coagulating tip being extended into the vestibule but not to the opposite wall.

Following coagulation there has been relief from the Tullio reaction and from the vertigo related to the open fenestra, but there have also been occasional spontaneous attacks of vertigo which may have originated from the other ear.

Tinnitus has also been present but not well localized to either ear.

DISCUSSION

The experience with these cases has permitted several significant observations.

1. Decompression of perilymph is of no value as a relief to Ménière's disease, or hydrops of the labyrinth.

2. A fistula made in a bony semicircular canal through a simple mastoidectomy approach and left uncovered will probably remain a permanently open fenestra,[14] which is undesirable because of the associated fistula symptom and Tullio phenomenon. Also a fenestra covered only by mucosa, might offer less resistance to infection in case of subsequent middle ear suppuration.

Closure of a fistula can be assured at operation by making a very small opening and leaving bone chips in it, and probably by destruction or removal of the membranous labyrinth.

3. The depression of the hearing threshold to a state of profound deafness in all four of these ears, including that in which only a simple fenestra was created, suggests that the

existence of a third window into the labyrinth in the presence of an intact conducting mechanism results in a definite threshold loss.

Whether such a hearing loss in the first three cases would have been avoided by causing the fistulas to close, thereby limiting the procedure to the intralabyrinthine injury, has not yet been determined.

SUMMARY

1. The prevention of attacks of vertigo along with destruction of auditory function has been formerly accomplished by labyrinthectomy operations, all of which involve extensive destruction of structures in the vestibule. Efforts to prevent vertigo by intralabyrinthine surgery, without causing destruction of hearing, have so far met with limited success. The following procedures have been done on humans:

a. Portmann's operation on the saccus endolymphaticus. This operation has preserved the hearing but has failed to give sufficiently good results in prevention of vertigo.

Experiments on the monkey have shown that drainage or destruction of the saccus, as well as nearly all of the ductus endolymphaticus, is followed by prompt healing and could only have a limited effect on a hydrops of the labyrinth.

b. Injection of alcohol.

c. Ablation of the ampullary end of the horizontal semicircular canal has been reported by Cawthorne to prevent attacks of vertigo consistently but also to cause deafness.

Accidental removal of part of the membranous canal at the fenestration operation or its revision causes temporary deafness, but hearing frequently returns to the previous level.

Obliteration of the horizontal canal for several millimeters distal to the ampulla in the monkey causes no histologic change in the auditory apparatus in most instances.

d. Coagulation of the ampullated end of the horizontal canal, with the tip of the instrument extending into the vestibule (Day's procedure) has prevented vertigo attacks consistently. Preservation of hearing occurred in about 10 percent of Day's cases but not in those reported by others.

e. Coagulation limited to one or more canals without entering the vestibule has prevented attacks of vertigo, but created profound deafness. It did not always abolish intermittent tinnitus and sense of blockage in the ear. In the monkey, no histologic evidence of injury to the auditory apparatus was caused.

f. Decompression of perilymph is of no value in the treatment of Ménière's disease.

g. A simple fistula in the horizontal canal, if made after simple mastoidectomy and left uncovered (the mastoid wound being closed), remains as an open fenestra beneath the mucosa which later lines the mastoid antrum. Such a fenestra in the presence of Ménière's disease is undesirable because of the further loss of hearing which occurs, the disturbing Tullio reaction and the possible tendency to facilitate infection of the labyrinth in case of a middle ear infection.

Closure of a fistula can be assured by keeping it a minimum size, leaving bone dust in it, and by destroying the membranous canal.

h. The histologic evidence obtained from monkey experiments, as well as the experience of Day in his use of coagulation on the human, lend encouragement to the search for a means of interrupting vestibular function without injuring the auditory apparatus. Further investigations are being carried out in which sound conditioned animals are utilized as well as histologic controls.

RIASSUNTO

Per prevenire gli attacchi di vertigine, con distruzione della funzione auditiva, sono state escogitate varie forme di labirintectomia, le quali coinvolgono estese distruzioni delle formazioni del vestibolo. La chirurgia del labirinto in questa malattia ha incontrato quindi finora pochi successi.

SUMARIO

La eliminacion de ataques de vertigo en la enfermedad de Meniere se obtiene al presente practicando la laberintectomia con destruccion muy extensa de la region del vestibulo y que da por resultado gran perdida de las funciones auditorias. Los esfuerzos del presente de tratar esta enfermedad por la cirujia intralaberintica solo ha dado exitos muy limitados.

SOMMAIRE

Comme remede aux attaques de vertiges accompagnées de destruction de la fonction auditive, on a beaucoup recours à la labyrintectomie; opération entraînant une destruction étendue des éléments du vestibule. Les efforts de la chirurgie intralabyrinthine sans destruction de la fonction auditive n'ont donné que rarement de bons résultats.

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Total Gastrectomy in Carcinoma of the Stomach

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UNTIL recently carcinoma of the stomach presented the gloomiest picture in medicine. Every year 150,000 people die of cancer, of these, from 25 percent to 40 percent are gastric neoplasms.[1,2] Of those who have applied for treatment, only four percent[3] live five years.

Unfortunately, many cases (50 to 60 percent of the cases) are seen too late, two-thirds of these are due to the patient's neglect and one-third are misdiagnosed.

Gastric carcinoma occurs so insidiously, that x-ray, gastroscopic examinations, laboratory work, and even laparotomy should be done if necessary, in order to establish an early diagnosis. One must not wait until the typical textbook picture is present. It has been found that routine x-ray examination of all adults is not feasible; therefore, one must always suspect carcinoma of the stomach, particularly in those people over 35 years of age, and where the following symptoms are present a complete investigation must be done:

1. Indigestion occurring the first time, fairly late in life and not yielding to ordinary measures.
2. Known ulcer patients who do not experience the usual relief with treatment.
3. Symptoms of ulcer appearing late in life.
4. A group in which fatigability, lack of concentration and judgment, and possible anemia occurs.

In 1943, Graham[4] said "Gastric carcinoma is not the hopeless disease so many patients and physicians believe. Many surgeons could recall survivals of 15 years or more, and if the primary mortality of total gastrectomy can be lowered, it may be possible to present patients who have survived a surprisingly long time without recurrence."

Apparently that time has come, Longmere[5] reporting his series and reviewing those of Horsley,[6] Farris Ransom and Coller,[7] Jones and Kehm,[8] concurs in this idea.

Surgery offers the only hope for relief and possible cure, and total gastrectomy which formerly was reserved for linitis plastica cases, which represent five percent of all gastric carcinoma, carcinoma of the cardia and the larger lesions of the rest of the stomach, should now be used for the smaller and earlier lesions.

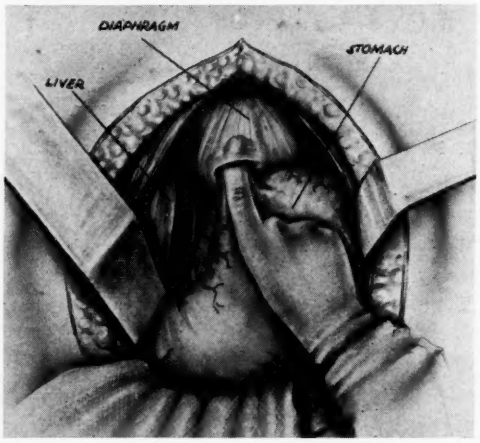

Fig. 1. Abdominal Route: Freeing of esophagus from the diaphragm and palpating for esophageal nodes.

This operation, with dissection of the regional lymph nodes (which are involved in 75.5 percent of the cases),[9] represents the modern method of block excision. In 25 percent of the patients, one cannot palpate the upper margin of the lesion, and, therefore, subtotal gastrectomy is not as efficient, although five year[3] survivals are 25 percent with the nodes involved, and 60 percent if there is no node involvement.[3]

The chief deterrents to total gastrectomy were the fear of high mortality and altered physiologic functions. Modern metabolic studies[11,12] have shown the absorption of carbohydrate, protein and fat, in most cases, is normal. However, fat metabolism sometimes presents a problem; occasionally there is an excess loss of fat or a high normal fat loss.

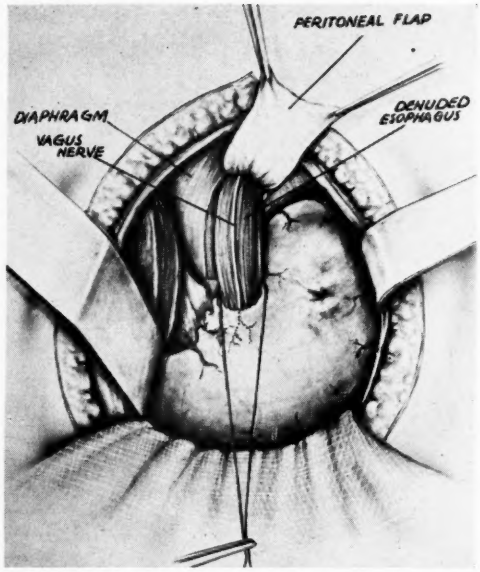

Fig. 2. Abdominal Route: Left lateral ligament of the liver cut; liver retracted to the right. Esophagus pulled down, peritoneal flaps reflected and vagi ready to be cut.

The normal loss of fat in dried feces, from five to ten gms. with an intake of 60 gms. This disturbance of fat metabolism accounts, in great part, for the failure of some of these patients to gain weight. Calcium and phosphorus is normal, as shown by the absence of osteoporosis and the presence of normal serum levels. Iron absorption is deficient in some cases. It is due to lack of hydrochloric acid, and hypochromic anemia ensues.

Pernicious anemia or pernicious-like anemia may occur, due to the loss of the intrinsic factor. Vitamins B, C and K absorption is normal, but vitamins A and D exhibit a delay. The loss of reservoir function is not missed. Spontaneous hypoglycemia occurs at times.

In view of the foregoing it will be seen, the effects of total gastrectomy are not sufficient to preclude it being done. Hypochromic anemia can be corrected by the administration of iron. Pernicious anemia or pernicious-like anemia, by the use of liver extract. The spontaneous hypoglycemia by regulation of the diet.

The disturbance of fat absorption can now be corrected by a new product, a non-ionic surface acting agent, polyoxyethelenesorbitan monoleate, known as P.S.M., which increases absorption of the fat from the small bowel, which will help to correct the main worry and chief complaint of the patient—the inability to gain weight. Ordinarily an increase of milk, meat and bread in the diet, and to chew the food well, will correct most of the dietetic insufficiencies in the average patient.

The great, possibly the greatest deterrent, was the high mortality rate in this procedure (50-60 percent). Today, however, the mortality rate has been reduced precipitously, and, in several small series, the mortality has been nil (Table 1). This is due to the advances in preoperative and postoperative treatment, better technique, chemotherapy, antibiotics, and a great improvement in anesthesia.

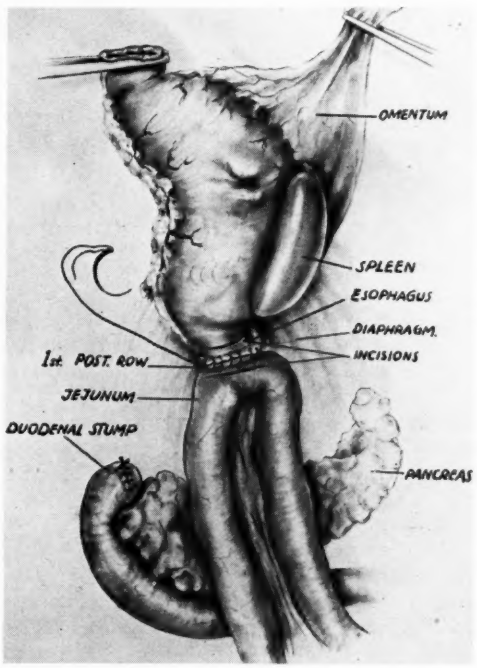

Fig. 3. Abdominal Route: Vessels have been cut and ligated; duodenum cut across, stomach pulled upward and to the left. Jejunum anastomosed to the posterior wall of the esophagus with interrupted silk sutures. Esophagus and jejunum incised.

Indications for Operation: Perform total gastrectomy for carcinoma whenever possible.

Contra-Indications:

A. Absolute.

Before Exploration: Cacchexia, ascites, a positive rectal shelf, supraclavicular nodes, marked liver involvement, umbilical metastases (?).

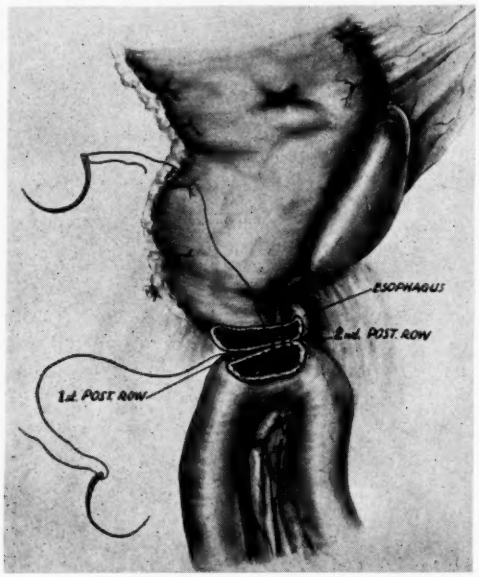

Fig. 4. Abdominal Route: Second posterior row of sutures inserted through and through.

On Exploration: Involvement of the nodes in the jejunal fossa, shot-like metastases in the root of the mesentery of the small intestine, peritoneal seeding, extensive involvement of the glands which cannot be removed, especially at the angle of the greater curvature and pylorus, and on the inner aspect of the first part of the duodenum.

B. Relative.

(1) Fixation of the mass, particularly to the head or body of the pancreas. (2) Involvement of the transverse colon. (3) Involvement of the small intestine. (4) Involvement of the abdominal wall. (5) Involvement of the paraesophageal nodes. (6) Marked edema at the site of the lesion. (7) Excess fluid in the cul de sac.

The above are classified as relative because

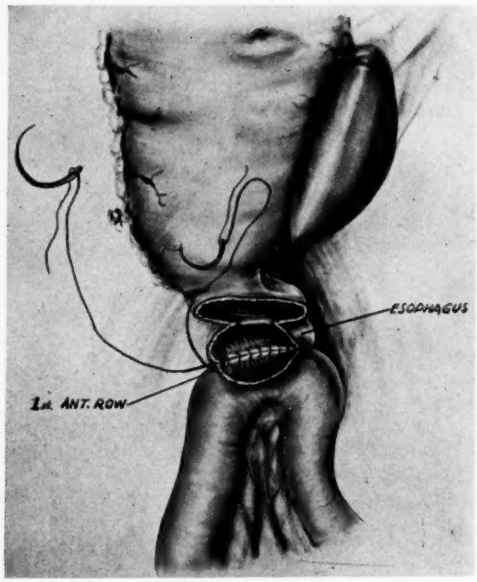

Fig. 5. Abdominal Route: The esophagus is cut off as first anterior row of suturing proceeds. This is a continuous suture.

resection of the involved area may also be done in addition to gastrectomy.

Resectability: Neither the size of the lesion nor the duration of the symptoms indicate the resectability of a lesion, even x-ray does not give one a true picture. It was reported that 14.3 percent of those x-rayed were deemed inoperable and 23.3 percent apparently were doubtful as to operability, yet all of these were found to be resectable. Pack's[22] resection rate is 40 percent of all gastric cancer cases "Just as they are, as they enter the door."

Palmer,[23] University of Chicago, found the resectability rate 43.5 percent. The survival rate of total gastrectomy in the past has been two years or less; about 20 percent living three years; however with the performance of total gastrectomy for smaller and earlier lesions, there is no reason why their longevity should not be materially increased.

Preoperative Treatment: Preoperative treatment has to be adequate; correction of dehydration, fluid and electrolyte balance, anemia and hypoprotonemia are most important. Most of these patients are in a state of chronic

TABLE 1. MORTALITY RATES

YEAR	NAME	NO. OF CASES	MORTALITY
1929	Finney & Reinhoff[16]	67	53.8%
1917-1933	Mayo Clinic (Waugh *et al*)	33	60.6%
1940-1943	Mayo Clinic (Waugh *et al*)	44	31.8%
1943-on	Mayo Clinic (Waugh *et al*)	20	25%
1938	Allen, Mass. General Hosp.[18]	16	50%
1946	Allen, Mass. General Hosp.[19]	84 (30 Transthoracic)	40%
1946	Lahey	89	29.2%
	Pack & McNeer[20] (Collected Series)	303	
Before 1921			49.3%
1921-1930			37.6%
1931-1942			34.3%
1943	Horsley[6]	3	0%
1943	Sweet[21]	7	28.5%
1945	Longmere[5]	20	10%
1945	Jones & Kehm[8]	8	0%
1946	Moreland[22]	6	0%
1946-1947	Halligan, Perkel & Catlaw	8 (4 Abdominal) (4 Abdominothoracic)	0%

shock (Champ Lyons) with a contracted vascular bed and a smaller blood volume, and the blood count does not reveal the evidence of the true condition.

Whole blood transfusions must be used preoperatively, during the operation, and postoperatively. Shock must be prevented at all costs. In our small series of cases, shock has never been a factor.

The use of amino acids is excellent in taking care of daily needs, if 70 percent caloric requirements are met with by carbohydrates, but are not effective for about 12 days, for the correction of hypoprotonemia. All protein given is first utilized to promote hemoglobin formation. The stomach is lavaged with saline, routinely, twice daily. In addition, dextrose in distilled water with vitamin B and C is given, intravenously, as food absorption is always interfered with; penicillin in oil, 300,000 units, is given for two days, preoperatively and postoperatively, as long as it is necessary. Inhalation of penicillin is given where the thoracic approach is used. The Levin tube is inserted before the operation and left in situ. In some patients it has been removed accidentally, postoperatively, with no bad results.

Anesthesia: In transthoracic and abdominothoracic operations, intratracheal anesthesia is used.

Continuous spinal of pontocaine and dextrose are used for the abdominal approach. In the old, the markedly debilitated, and those with cardiac, renal, or diabetic complications, we use intercostal block, with posterior splanchnic analgesia.

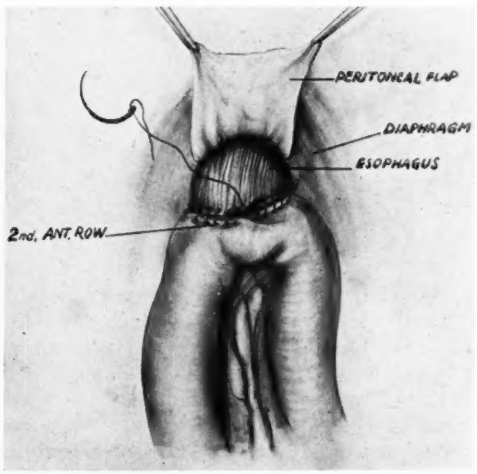

Fig. 6. Abdominal Route: Second anterior row of sutures are interrupted silk.

OPERATION

By means of a long, left rectus incision the abdomen is explored and if operation is feasible, the left lateral ligament is cut, the liver is retracted to the right, the peritoneal flaps are outlined and fashioned on the diaphragm, and elevated. The vagii are exposed. The position of the right vagus nerve on the anterior surface varies anywhere from the middle of the esophagus to just lateral to it. The right vagus varies in position from the middle of the posterior surface of the esophagus to just medial to it. The vagus nerves are cut; this allows mobilization of the esophagus, and in addition, relieves pain and vomiting due to traction, and lessens shock.

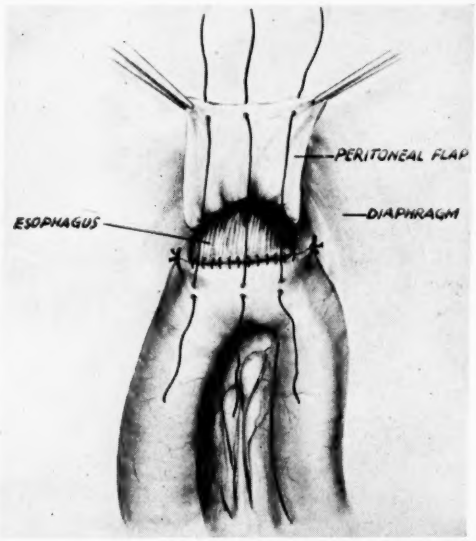

Fig. 7. Abdominal Route: Peritoneal flap is sutured to the jejunum beyond the suture line. The jejunum is then suspended to the diaphragm by interrupted sutures.

The paraesophageal nodes are palpated and if involved the patients may be inoperable. The omentum is mobilized from the transverse colon. The right and left gastro-epiploic vessels are ligated. The duodenum is cut across and closed with three layers of sutures, the last layer is silk or fine wire. The stomach is turned up to the left. The left gastric artery is ligated as it comes off the celiac. All the glands are removed, with their respective vessels.

The splenic vessels are ligated proximally and clamped near the spleen and cut. The jejunum is brought up anterior to the colon and is now united to the posterior wall of the esophagus with interrupted silk sutures.

The posterior wall of the esophagus and jejunum are opened and a second posterior layer of sutures, continuous chromic catgut sutures, which is continued as a first anterior row of sutures; the esophagus is cut off as suturing proceeds. The second anterior row is of interrupted black silk. The peritoneal flap is sutured to the jejunum, covering the anastomosis. The jejunum is anchored to the diaphragm with black silk sutures. The peritoneum is closed with chromic catgut. The fascia with fine steel wire and the skin in sutured with silk.

Abdominothoracic Approach (four cases): The patient is placed on the right side, tilted back from about five to ten degrees. The arm is held over the head.

A high left rectus incision is used, the abdomen is explored, and, if operation is feasible, the incision is extended out through the costal cartilage and left eighth interspace, through the muscles and pleura. Retractors spread the ribs apart. The diaphragm is incised radially from the hiatus to the ribs. This type of incision gives you the greatest exposure of both the chest and the abdomen.

The technique of removing the stomach, lymph nodes, omentum and spleen is the same as in the abdominal approach, except that the esophagus can be mobilized more freely and removed at a higher level.

The jejunum is brought up anterior to the colon; often the jejunum will only reach about three cm. above the diaphragm, so the main jejunal vessels are cut carefully, preserving the arches, this gives one about three inches more above the diaphragm.

The anastomosis is the same. Enteroanastomosis sometimes is performed. The diaphragm is closed around the loops of the jejunum. The chest and abdomen are closed in the usual way. Drainage of the chest with a catheter under water, may or may not be done.

Postoperative Treatment: Maintain fluid and electrolyte balance, employ dextrose,

Fig. 8. Abdominothoracic Route: Patient on left side, tilted backward 5 feet, arm above head. Left rectus incision, abdomen explored, incision carried out through eighth intercostal space.

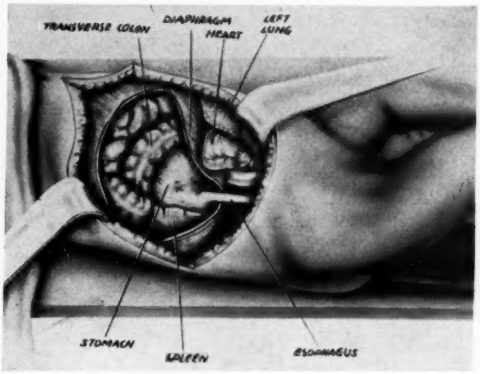

Fig. 9. Abdominothoracic Route: Diaphragm has been incised from hiatus to costal margin. Note wide exposure obtained.

amino acids, and transfusions. Penicillin in oil, 300,000 units, is given twice daily for several days. Continuous suction is maintained for four days. The tube is then removed and the patient is allowed water, tea without milk, clear broth is allowed, one ounce every hour, gradually increasing this amount until the seventh day. After the seventh day, fluids are allowed freely. The tenth day a soft diet is permitted; the sixteenth day a regular diet is given. Carbon dioxide inhalations are given routinely.

Peritonitis with leakage has been the chief complication and cause of death. This led Graham to devise a special type of operation. The pulmonary complications are chiefly pneumonia and atelectasis. Other complications are: cardiac failure, subphrenic abscess, pulmonary embolism and volvulus of the jejunum.

All the above complications are not necessarily fatal. Occasionally, persistent diarrhea has been noted after total gastrectomy. We have had none in our series of cases.

Iron is given in the form of ferri sulphate, routinely. Stricture at the site of the anastomosis may occur, but can be relieved by the passage of bougies. One of our patients complained of a sensation of burning when he first began to eat, but, after swallowing two or more mouthfuls, this would disappear. Recurrences occur most frequently in the liver and the peritoneum; even if this does occur, the patient's life has been prolonged and they are vastly more comfortable than they would have been with their original lesion.

Eight cases of total gastrectomy, without a mortality, are reported. Four by the abdominal route and four by the abdominothoracic route, using the Garlock incision. The first of this series was done in October 1946, and the last, December 23, 1947.

The four abdominothoracic cases were lesions of the cardia, the others, of the body. All were large extensive lesions. The postoperative course of two was marked by pulmonary complications, that is, atelectasis in one, and pneumonia in the other, but, with judicious use of penicillin they both recovered.

The first patient gained 26 pounds and is back to normal weight. The others remain at least 10 to 15 pounds under their usual weight. All have been able to eat well and indiscriminately with the exception of two, who have to eat smaller meals but more frequently. There has been no diarrhea nor stricture at the site of the anastomosis. It is almost too early for anemia to appear, but they are taking iron.

SUMMARY

Total gastrectomy is advocated for earlier and smaller lesions in carcinoma of the stomach. The mortality rate in this operation has been reduced, so that it is no longer prohibitive. Physiologic functions following this operation are not altered sufficiently to pre-

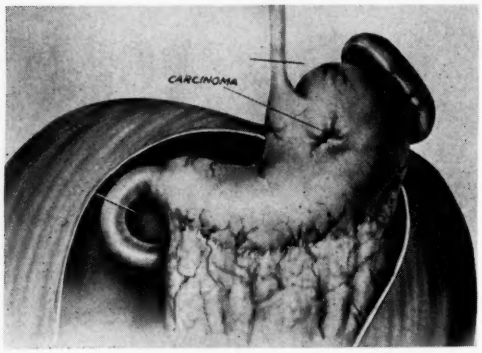

Fig. 10. Abdominothoracic Route: Level of resection of the esophagus with spleen and omentum attached.

clude its performance. Early diagnosis, while earnestly advocated, has proven to be a myth. A series of eight consecutive cases of total gastrectomy, without a mortality, is reported.

RIASSUNTO

L'A. riporta otto casi consecutivi sottoposti a gastrectomia totale senza alcuna mortalita'. Cio' dimostra che un'operazione del genere, che l'A. consiglia anche nei canceri iniziali e poco estesi, non e' piu' da considerarsi come proibitiva. Anche le modificate condizioni fisiologiche dopo l'operazione non sono tali, da sconsigliare l'intervento. L'unica nota stonata e' tutt'ora l'impossibilita' di una diagnosi veramente precoce.

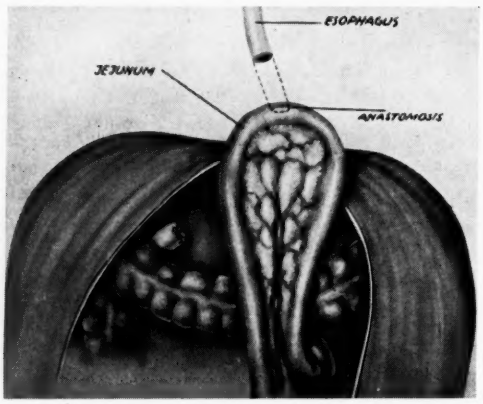

Fig. 11. Abdominothoracic Route: Anastomosis of jejunum to ileum above diaphragm. Main vessels in jejunum may be cut as advocated by Sweet, to bring the jejunum higher above the diaphragm.

SUMARIO

El autor recomienda la gastrectomia total en las lesiones canerosas peque nas y de poca duracion. La mortalidad con esta operacion se ha reducido lo suficiente para no ser ya prohibitiva. La funcion digestiva no se altera lo suficiente para precluir esta operacion. El diagnostico del cancer del estomago en sus comienzos es un mito. Se han reportado una serie de ocho casos consecutivos de gastrectomia total sin mortalidad.

SOMMAIRE

La gastrectomie totale est recommandée pour les lésions précoces et peu étendues du carcinome de l'estomac. Le taux de mortalité de cette opération a été reduit et l'opération n'est plus prohibée. Les fonctions physiologiques qui suivent cette opération ne sont pas altérées suffisamment pour l'interdire. L'auteur rapporte huit cas consécutifs de gastrectomie totale sans mortalité.

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The Preoperative and Postoperative Care of Carcinoma of the Rectum and Pelvic Colon*

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INTERNATIONALLY, the value of systematically planned preoperative, operative and postoperative measures in surgery for cancer of the rectum and pelvic colon have been so repeatedly emphasized that the general acceptance of these principles is now universal.

It is my privilege to bring to this assembly a summary of progress manifest in American Clinics as a result of the acceptance of a planned care of the cancer patient as presented herein.

The present status of mortality, respectability, operability, and survival can best be judged by observing statistics of followup in various centers where emphasis is on radical surgical cure, yet, where a different surgical approach to the problem in most cases is followed.

At the Memorial hospital in New York City, Binkley and Deddish consider the procedure of choice for resection of cancer of the rectum, the Miles abdominal perineal operation because it gives the patient the greatest chance of survival based on the assumption that, while eradicating the primary, it offers complete removal of the node bearing areas. The mortality rates as reported by Binkley and Deddish[1] are outstanding and reflect the strides of the time toward radical cure. From 1930 to 1939 they report a mortality rate of 16 percent. From 1940 to 1946, it was 2.3 percent. In 1939, 130 consecutive operations for rectal cancer were done without a death. The five year survival rate is 50 percent.

On the other side of the picture, Bacon in Philadelphia reports an equally startling series for radical cures. The procedure of choice here is the abdominal perineal proctosigmoidectomy with conservation of the sphincter mechanism. In 1946 at the International College Assembly, Lima, Peru,[2] a series was reported of 251 consecutive abdominal perineal proctosigmoidectomy operations with a mortality rate of 5.9 percent; 145 radical resections had been performed without a single death. Recently,[3] Bacon has completed 379 proctosigmoidectomies with 18 deaths—a mortality of about 4.8 percent. The five year cure rate, including those for palliation as well as for cure, is 52.6 percent. Of 560 cases employing various methods and reported recently,[4] 526 had been operated upon, giving an operability rate of 90.2 percent; 467 were resected —a resectability rate of 80.1 percent with a mortality from resection of 5.5 percent (26 deaths).

At the Bacon Department of Proctology, Temple University Hospital and Medical School, while all methods suitable at the time of operation for radical resection for cancer of the rectum are employed, it was found that the establishment of an abdominal colostomy and sacrifice of the sphincter muscles was unnecessary in a large percentage of cases. The proof of this is borne out by reflecting on the five year survival rate.

Jones[5] of the Cleveland Clinic reports 139 consecutive combined abdominal perineal resections of the rectum from October 1941 to June 1943 without operative mortality and 535 consecutive one stage abdominal perineal resections from 1942 to 1946 with 20 deaths—a mortality rate of 3.7 percent. His survival rate is 52 percent for five year cures.

Lahey[6] in 1946 reported a resectability rate of 83.5 percent and a mortality rate of 3.8 percent. A five year nonrecurrence rate for his entire series of 1800 cases was 50 percent. Dixon,[7] the champion of the anterior resection for low cancer of the rectum followed by establishment of intestinal continuity has reported 340 cases operated with a mortality

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rate of 5.9 percent from 1930 to 1945, and a mortality rate of only 1.1 percent for the last five years of that period. His five year survival rate, nonpalliative (palliative cases excluded) is 67.7 percent.

It is of interest to note that Doctor Dixon's[8] curiosity to follow the technique of anterior resection was aroused when he observed that patients on whom he had performed the Hartman operation, continued to live many years without recurrence. It is also of interest to note here that Dixon[8] feels that the Miles operation is not sufficiently radical as his percentage of perineal recurrence was high. He has now performed between 200 and 300 radical posterior perineal resections including levators and part of the gluteus following single-barrel colostomy and preliminary ligation and division of the superior hemorrhoidal vessels. His results will shortly be forthcoming.

Gilchrist[9] like Dixon feels that unless the gland bearing area can be completely eradicated the low anterior resection should not be employed, but, that a Miles operation, or a modification thereof, should be used. His five year survival for resection of the colon and rectum on 114 cases was 57 percent. The operability rate on 200 cases reported was 75 percent.

Let us now look in retrospect to methods of preparation and postoperative care (Table 1).

Experience suggests that preoperative preparation paves the way for uneventful surgery, and uneventful surgery carefully planned and performed, paves the way for uneventful convalescence. It is seldom less than a week that such preparation can be carried out.

The preparation of the patient begins in the office where the success or failure of the operation can be decided. Personal experience proves it is best not to inform the patient the true nature of the condition. The word "malignancy" can indeed be a frightening word and often demoralizes the patient, thus increasing operative risk. Next, the patient is placed into a hospital ambulant. Habits of a lifetime should not be disrupted abruptly.

To evaluate the patient risk careful physical examination is carried out. This physical includes electrocardiographic study, vascular status, evaluation of hepatic dysfunction, degree of anemia, prostatic hypertrophy, urinary dysfunction, and metabolic disturbances of sorts. Since a large percentage of patients with cancer of the rectum and colon present varying degrees of metabolic disturbance, hypoproteinemia and avitaminoses with associated dehydration, a concentrated effort is made to place the patient in caloric, nitrogen, fluid and electrolyte balance, as well as in a state of high vitamin concentration. High protein, high carbohydrate and low fat diet is employed consisting of 400 grams of carbohydrate, 120 grams protein, and 50 grams of

TABLE 1. MORTALITY AND SURVIVAL RATES

CLINICS	NO. OF CASES	MORTALITY Percent	CONSECUTIVE OPS. No. Deaths	SURVIVAL 5 Yr. Percent
Binkley—Memorial	—	2.3 (1940-1946)	130	50
Lahey—Lahey Clinic	1800	3.8	—	50[1]
Bacon—Temple University	379 A.P.P.S.***	4.8	145	52.6*
Jones—Cleveland Clinic	535 A.P.R.****	3.7 (1942-1946)	139	52*
Dixon—Mayo Clinic	340 A.R.*****	5.9 (1930-1945) 1.1 (1940-1945)	—	67.7**

* Palliative Cases Included.
** Palliative Cases Excluded.
*** Abdominal Perineal Proctosigmoidectomy.
**** Abdominal Perineal Resections (Miles).
***** Low Anterior Resection—Intestinal Continuity Re-established.
1. 5 Years without recurrence.

fat. To supplement this, 100 grams of Delcos Granules are mixed daily with feedings.

Fluids are forced, if not otherwise contraindicated, to insure a urinary output of 1000 cc. All fluid intake and urinary output is carefully recorded on special fluid balance charts. This will serve as a guide in determining postoperative fluid tolerance and output (Table 2).

TABLE 2. DIET: LOW RESIDUE, HIGH PROTEIN, LOW FAT

	GRAMS	CALORIES
Carbohydrate	400	1600
Protein	120	480
Fat	50	450
Delcos Granules	100	320
(Carbohydrate-Protein Mixture) TOTAL	670	2850

Apparently something happens coincident with the presence of the neoplasm which seriously disturbs hepatic function. This so called hepatic dysfunction reflects itself in lowered plasma protein, anemia and hypoprothrombinemia. For this reason determined efforts are made to evaluate the preoperative liver.

On the Rectal Service, Memorial hospital, several criteria are used for determining hepatic dysfunction.[10] Plasma bilirubin levels are carefully observed both preoperatively and postoperatively especially when multiple transfusions are being administered. Bilirubin levels of one mgm. percent or slightly above are normal. If it is higher than that, 2.5 to 3 mgms., something wrong is suspected with the excretory ability of the liver. The second criteria is hypoproteinemia. Levels of 6.5 grams percent of protein are aspired to. At the Bacon Clinic studies were made on all cases with rectal cancer and it was reported[11] that 29.7 percent of the patients were hypoproteinemic.

The use of plasma, diet and hydrosylate is considered the best means of elevating protein blood levels. Usually these patients are also anemic and sufficient blood in small daily amounts, together with injections of crude liver and iron is given to raise the grams of hemoglobin to 14 percent, and the erythrocyte count to at least four and a half million. In the presence, however, of elevated serum bilirubin, caution is advised toward the employment of whole blood. The third criteria to help determine liver dysfunction is hypothrombinemia. If it is remembered that vitamin K is necessary before prothrombin can be made by the liver, we should not wonder why low levels can be a serious matter.

Slow healing of wounds with oozing is often a sequela of this dysfunction which predisposes to sepsis and which in turn gives rise to postoperative loculations of pus and disruption of the postoperative incision. Vitamin K, mgm. 20, is given daily for three days prior to surgery, and for three days thereafter. Other useful adjuncts in helping to evaluate hepatic status are plasma level of vitamin A and the cephalin flocculation test.

It is a well known fact that vitamin levels in most patients with rectal and colonic cancer are low in proportion to low chlorides, proteins and other basic elements. Inasmuch as the ability of the organism to absorb vitamins is disturbed seriously, an attempt should be made to overwhelm the patient with extremely high concentrations of vitamins. Orally multiple vitamin capsules such as Zymacaps are prescribed T.I.D. Again three days preoperatively vitamin C, 1000 mgm. and Lyo B-C are supplemented intravenously. Where capillary fragility seems more marked than normal, Rutin, mgm. 20, is given daily.

ANTIBIOTIC THERAPY

It is generally agreed that the greatest single advance in surgery of the colon and rectum has been the discovery and the use of nonabsorbable sulfonamides and streptomycin. At the time the diagnosis of cancer is made the patient is placed on one of the nonabsorbable sulfonamide compounds. For a 70 kilogram patient, grams one and a half, Q.I.D. will produce the desired therapeutic effect in cleansing the colon.[12] Sulfathalidine is to be preferred to sulfasuxidine (succinylsulfathiazole) because dose for dose it is twice as effective for enteric bacteriostasis, it is less toxic[12,13,14,15,16] and it exerts a less diarrhetic effect on the stool.

In studies made on the potency of sulfathalidine on 54 cases including 19 proctosig-

moidectomies at Temple University hospital, Department of Proctology, it was shown that sulfathalidine was more potent than sulfasuxadine and that in many cases the quantitative coliform studies of the collected stool after five days' administration, giving 0.1 gram per kilogram weight Q.I.D., often showed a reduction from 200 million to 10,000 organisms in many cases. Postoperatively as soon as the patient is able to tolerate any fluids by mouth, the preoperative dosage is begun.

More recently we have supplemented streptomycin, and it is thought that the future in colonic surgery will hold more startling results. Streptomycin has proven to be more potent than either succinylsulfathiazole or sulfathalidine when given orally at the rate of two grams (two million units) daily, providing that it is not given for more than two days (48 hours) as it has been shown that after two grams have been given daily for two days, the coliform organisms develop a resistance to the drug, and regardless of the amount given thereafter, in most cases coliform organisms will continue to remultiply and a reversion of count will be noted.[16,17] Grams, one quarter in two ounces of saline are given orally, Q 4 hours for two days preceding operation and discontinued the day of surgery.

for that same period. Sulfathiazole sodium is not used preoperatively but 2½ grams B.I.D. is given postoperatively for 48 hours.

Thirty-six hours prior to surgery, providing no obstructive element is present, castor oil ounces 1½ is given followed in 24 hours by saline aspiration enemata until the return is clear. To insure complete intubation, a large size soft rubber tube is left within the lumen of the rectum. An indwelling self-retaining catheter is placed within the bladder which, preoperatively had been evaluated by cystometric studies[18] for bladder capacity and tonicity and by cystoscopy for the presence of an encroaching extra vesical lesion, and prostatic hypertrophy. A weighted intestinal tube is passed to the stomach and this is connected to a Wangensteen suction. It is continued in force during the operation, and postoperatively until all signs of abdominal distention have abated (Table 3).

OPERATIVE CARE

The observation and care of the patient while in the operating room is of equal importance. The choice of anesthesia at St. Mary's, Highland, Park Avenue and Monroe County hospitals, Rochester, N. Y., is continuous spinal or fractional anesthesia using one percent pontocaine in ten percent dextrose

TABLE 3. ANTIOBIOTIC THERAPY

	PREOPERATIVE	POSTOPERATIVE
Sulfathalidine (Phthalyl-sulfathiazole)	0.1 grams per kilogram wt. (5 to 7 days)	Same dosage when oral fluids are tolerated
Streptomycin	2 grams daily (48 hrs. before surgery) (0.25 grams Q 4 hrs. for 48 hrs.)	Same as preoperative; Intramuscularly—2 days
Penicillin (oil)	None	300,000 U.I. daily for 2 days
Sodium sulfathiazole	None	2.50 grams b.i.d. i. v. 2 days

At the present time, I am also using grams two in saline in the peritoneal cavity following resections with open anastomosis. Postoperatively, where contamination has occurred, grams ¼ Q 4 hours for two days intramuscularly are employed, and 300,000 I.U. penicillin in oil daily intramuscularly

solution. However, anesthetic agents selected depend on the anesthetist in relation to his particular findings in the individual case, and the needs of the surgeon.

Care must be used in strapping the patient to the table. Tight straps across the thighs, popliteal space or about the ankles is abso-

lutely contraindicated because of danger of vascular injury and therefore, predisposition to venous thrombosis. Airfoam rubber is used to protect the soft parts from the strap. Trendelenberg operating position is preferred because it permits the small intestine to be cleared from the pelvic operative field without the forceful use of packs, surely an important factor in avoiding the formation of adhesions. Whole blood is always available and 1000 cc. are given as needed during the operative course. Continuous Wangensteen suction is maintained. Closure is always by figure-of-eight Jones type of closure and with Babcock No. 32 alloy steel wire. The low incident of skin infection reported[19] can be attributed in part to the use of wire.

POSTOPERATIVE CARE

Postoperative care unduly neglected may convert the most skillfully performed operation into a tragedy. Skilled nursing is imperative during this immediate postoperative period. High concentrations of oxygen whether by means of tent, dome or mask are given for 24 hours to reduce the amount of body nitrogen and thus avoid intestinal distention.[20, 21] Postoperative atelectasis should be watched for and measures immediately taken for its correction. If a bronchial plug is suspected, no time should be lost in aspirating the throat or performing bronchoscopy.

Passive, and later active movement of both lower and upper extremities is paramount to discourage venostasis. The lower extremities must be observed daily for tenderness together with unexplained pulse accelerations and apprehensiveness. Oftentimes the above may be the only indication of the formation of a silent venous thrombus. If it is suspected, no time is to be lost in placing the patient on heparin and bicumerol. Where a Miles' resection has been performed and a large residual perineal cavity is present, I am inclined toward immediate bilateral femoral ligation instead of anticoagulants.

FLUID BALANCE

Postoperatively, methods of determining the patient's water balance are paramount. In an attempt to estimate water balance, we should have some idea of the patient's average post surgical daily intake, and balance this against loss of fluid by respiration, insensible loss through perspiration, kidneys, gastrointestinal tract (vomiting, diarrhea), intraperitoneally through Babcock sump drains, and Wangensteen suction.[21] Sufficient fluids to insure a urinary output of 1000 cc. is always a good norm to follow. However, necessary supplementary methods to determine water balance should be employed such as erythrocyte count, hemoglobin, hemotocrit, serum protein and chlorides.

Saline during the immediate postoperative period is avoided as salt is not tolerated well by the patient[22] especially in the presence of general body protein depletion. At first it should not exceed 500 cc. daily unless an excess amount is being lost by vomiting, diarrhea or draining areas. It has been my custom to immediately employ postoperatively ten percent dextrose in sterile distilled water, to allow fluids freely by mouth providing the Wangensteen suction is functioning, and water ounces one, Q one hour with the Wangensteen closed for 15 to 30 minutes. Gradually the patient is placed back on salt to 18 grams daily, this usually being supplied in the form of 1000 cc. of five percent dextrose in normal saline and in 1000 cc. amigens (a protein hydrolysate).

NITROGEN BALANCE

Just as an attempt was made to maintain the patient in positive nitrogen balance preoperatively, so it is just as necessary to maintain him in postoperative positive nitrogen balance. Since approximately 30 percent of patients with rectal and colonic cancer are hypoproteinemic,[24, 25, 26, 10, 22] and since it is an established fact that the postrectal cancer resected patients not only lose protein rapidly but do not even make it very well,[10] every effort must be made to supply adequate amounts. High protein reserves should be aspired to preoperatively. In my patients this is done postoperatively by means of the liberal use of small individual transfusions of whole blood, plasma and a hydrolysate. However, the earliest possible return to a high protein, low residue diet is the best means of maintaining nitrogen balance (Table 4).

It is timely to mention that when the Miles type of abdominal perineal resection or the

TABLE 4. EXAMPLE OF POSTOPERATIVE FLUID REGIMEN

FIRST DAY		
Dextrose, 10% in sterile distilled water		2500 cc.
Amigen, 5% in 0.9% NaCl solution		500 cc.
Whole Blood		250 cc.
TOTAL		3250 cc.
SECOND DAY		
Glucose, 5% in 0.9% NaCl solution		1000 cc.
Amigen, 5% in 0.9% NaCl solution		1000 cc.
Whole Blood		500 cc.
Sodium Lactate, 6 molar solution		500 cc.
TOTAL		3000 cc.
VITAMINS IN FUSION		
Vitamin C., mgm. 1000		
Lye-B-C, ampules 1	Thiamine Hcl.	100 mg.
	Riboflavin	10 mg.
	Pyridoxine Hcl.	10 mg.
	Calcium Pantothenate	50 mg.
	Niacinamide	250 mg.
	Ascorbic Acid	200 mg.

abdominal perineal proctosigmoidectomy is performed, it is possible to begin postoperative oral feedings as soon as the colostomy clamp in the former is removed and/or when the patient has had his first bowel movement. In anterior resection with end-to-end anastomosis, on the other hand, the period of postoperative oral starvation is prolonged and the transition to a preoperative diet is gradual. The patient is then maintained on a low residue diet for approximately two weeks. Careful observation of protein, chlorides, CBC and hemoglobin must be made, and intravenous fluid therapy continued over a longer period.

URINARY BLADDER MANAGEMENT

Complications of the urinary tract postoperatively are rather frequent probably for several reasons and first become evident 48 to 72 hours postoperatively. A preganglionic sympathectomy is done in freeing the rectum from its pararectal attachments,[18] thus placing the bladder in a state of hypotonicity with increased spasm of the detrusor. Likewise the posterior wall of the bladder is left without anything to push against when contracting because of removal of the rectum. Another reason is the irritation caused at the trigone by the indwelling catheter, thus causing bladder spasm. To avoid complications the bladder is irrigated daily through the self retaining indwelling catheter with 1:4000 acriflavin solution and at no time is the bladder allowed to become over distended.

On the fifth postoperative day the catheter is removed and a urinary specimen is taken for laboratory study. Every eight hours the patient is catheterized for a residual urine. If over three ounces remains after 48 hours then the catheter is replaced. Often-times, especially after the Miles operation, it is necessary to send the patient home with a catheter in situ and even at times transurethral resection may be resorted to. In no cases following abdominal perineal proctosigmoidectomy at the Bacon Clinic was it necessary to resort to transurethral resection.

Variations occur in the technical postoperative management of the cancer-resected patient depending on the procedure followed. Where the Miles resection had been performed, the perineal pack is loosened on the second postoperative day coincident with removal of the colostomy clamp, and completely removed on the third and fourth postoperative days. It is our custom for seven days to irrigate the open perineal cavity daily with cod-

liver oil and thereafter, with one percent ammonium bicarbonate solution. In the abdominal perineal proctosigmoidectomy, the perforated perineal drain is removed on the second day and the rectal tube on the event of the first bowel movement. In either case the duodenal tube is removed after the first bowel movement providing no abdominal distention is apparent.

Where anterior resection has been performed with immediate end-to-end anastomosis preceded by colostomy or cecostomy, the patient is orally starved. Nitrogen balance is maintained parenterally for three days, or until the patient is returned to a low residue diet. Sulfathalidine, two percent solution, ounces four is instilled into the distal colostomy daily. Instillation into the distal colostomy of ounces one of glycerin to ounces three of water is carried out and this usually effects a bowel movement within thirty minutes. In the two former operations, i.e. abdominal perineal proctosigmoidectomy and Miles, the patient is out of bed walking on the fifth postoperative day; in the latter, (Anterior Resection) on the first postoperative day.

COLOSTOMY CARE

It is not sufficient to carry the patient to an uneventful postoperative convalescence and then abandon him with a colostomy. As physicians and surgeons it is our duty to encourage, support, and instruct these patients so that they may be psychologically rehabilitated to a new way of life. On my service, the patients are instructed on colostomy care describing it in detail but in simple terminology. On the eighth postoperative day methods of irrigation are demonstrated, the patient gradually being taught his own care. Colostomy bags are best discouraged. Where the colostomy stump is too long, revision of the colostomy is done by electric snare several days before hospital discharge.

RIASSUNTO

Le cifre riportate dall'Autore riassumono i progressi realizzati nelle cliniche americane in base ad un ben predisposto piano di misure preoperatorie, operatorie e postoperatorie. L'A. discute la chirurgia di questi carcinomi dal punto di vista della mortalita', dell'operabilita' e delle percentuali di sopravvivenza. La preparazione degli ammalati si riassume nella ricerca di un equilibrio fisiologico e psichico. La funzione epatica va studiata preventivamente. Il successo operatorio dipende in gran parte dall'uso di sulfamilici non assorbibili e di streptomicina: dalla trasfusione di sangue totale: dall'uso di speciali fili di acciaio. La convalescenza dipende invece dal la conservazione del bilancio idrico e dell'azoto: da una precoce deambulazione: da una cura scrupolosa della colostomia.

SUMARIO

El autor discute el valor del plan sistematico en el tratamiento pre-operatorio, operatorio y post-operatorio del cancer del recto y colon pelvico, vajo el punto de vista de la mortalidad, resectabilidad y operabilidad de estos tumores. Las figuras presentadas son un indicio del progreso de las clinicas americanas. En el tratamiento pre-operatorio se debe de tratar de obtener el balance fisiologico y psicologico del paciente. Este debe de incluir la evaluacion de la funcion hepatica, el uso de las sulfonamidas de menos absorcion y la streptomicina. La transfucion de sangre y el uso de ciertas suturas de alhambre de acero contribuyen materialmente al exito de la operacion; mientras que la mantencion del equilibrio del nitrogeno proteico y del agua del paciente y el cuidado de la colostomia facilitan la convalesencia postoperatoria del paciente.

SOMMAIRE

Il importe d'observer attentivement les mesures préopératoires, opératoires et postopératoires à employer dans le traitement chirurgical du carcinome du rectum et du colon pelvien. Il faut envisager et considérer la mortalité, la résectabilité, l'opérabilité et le taux de survivance. L'auteur nous donne des chiffres qui nous indiquent le progrès manifeste obtenu dans les cliniques américaines. La préparation préopératoire du malade demande qu'il soit placé dans un état physiologique et psychologique aussi proche du normal que possible. Il s'agit d'étudier les fonctions hépatiques et l'emploi des sulfonamides et de la streptomycine. Les infusions sanguines et l'emploi de sutures en alliage d'acier contribuent au succès opératoire. Il maintenir la

balance de l'eau et du nitrogène. Il ne faut pas trop prolonger le séjour au lit. Avec la colostomie, soignée intelligemment, on obtient une convalescence postopératoire satisfaisante.

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Cystic Omental Bursa: Pseudopancreatic Cyst

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PSEUDOPANCREATIC cysts is a confused subject. Thirty years ago Besley[1] suggested that the entity be called a collection of fluid in the lesser peritoneal cavity resulting from trauma to the pancreas. Jordan Lloyd[2] who probably first recognized the true character of these tumors voiced this same opinion in 1898. Lately, Pinkham[3] has questioned the naming of these tumors and believes that they should be referred to as collections of fluids rather than "false" or "pseudo" cysts.

Despite the general acceptance of the qualitative definition as given by Besley, numerous contributions on the subject in the recent literature continue to classify these inclusions under pancreatic cysts.

The origin of the cyst is clear. Injury to the upper abdomen followed by a fluid mass pointing either between the stomach and liver, the stomach and transverse colon, or below the transverse colon, indisputably implicates trauma as a direct cause (Fig. 1). Moreover, the nature of the injury is so similar that a careful history-taking suggests a diagnosis. There is usually the story of having been rolled over by a vehicle, of having sustained a sudden sharp blow as from a baseball, or a kick in the upper abdomen; in time a cystic mass appears, but not necessarily with much subjective disturbance to the patient.

The sequence of events is as follows: there is a force sufficient to injure the peritoneum overlying the pancreas. The pancreas is crushed and blood and pancreatic secretions fill the lesser peritoneal sac. This is in conformity with the anatomic relationship of the pancreas to the lesser sac, and may be observed in the foregoing figure (Fig. 1). Inflammation sets in and a plastic exudate seals off the foramen of Winslow. If the now enclosed fluid continues to accumulate, the omental bursa distends beyond its normal limits pushing aside all adjacent structures until it reaches the parietal abdominal wall where it may be palpated.

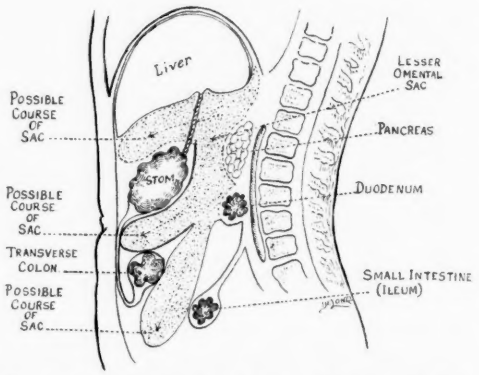

Fig. 1. Schematic drawing showing the anatomic relation of the lesser omental sac to pancreas and other organs. Finger-like projections show the possible courses which the cyst might take.

It is apparent that the pancreas may be involved only secondarily in the formative process. Hemic tumors without any direct pancreatic involvement are known. Consequently any causative force capable of producing the aforementioned steps may bring about a bursal swelling.

On the other hand, acute or chronic pancreatitis with hemorrhage, hemorrhagic necrosis, chronic interstitial pancreatitis, biliary diseases and carcinoma, all have been indicted as direct or indirect causes of cyst formation. In so-called "pseudo" cysts, they are contributing causes only inasmuch as they institute the trend of events sufficiently to wall off the lesser peritoneal cavity and cause it to distend beyond its boundaries.

To call these cysts pancreatic because fat-splitting, diastatic and proteolytic enzymes have been isolated in their fluid content is as illogical as to assert that a true pancreatic cyst must contain these ferments. Opie[4] has long ago shown that pancreatic enzymes have been found in fluids not in any way related to the pancreas and many true pancreatic cysts are completely void of all traces of pancreatic secretions.

Pedagogically at least it would seem consistent that these tumors belong to pathologic considerations of the lesser peritoneal sac.

Despite the apparently intrinsic relationship of trauma to these cystic collections, it is not always possible to elicit a traumatic history. A direct cause-effect sequence as reported in the literature varies from 20 to 35 percent, depending upon the author and the series studied.

In the following two cases, the patients were unable to recall even the most trivial injury in association with their illness. The first awareness of a tumor came as a shock when they were informed of its presence by the examining physician. Each patient had had pain in the epigastrium, some nausea, and gastrointestinal upset. That a cyst could have reached the presenting size without the patient becoming aware seems incredible.

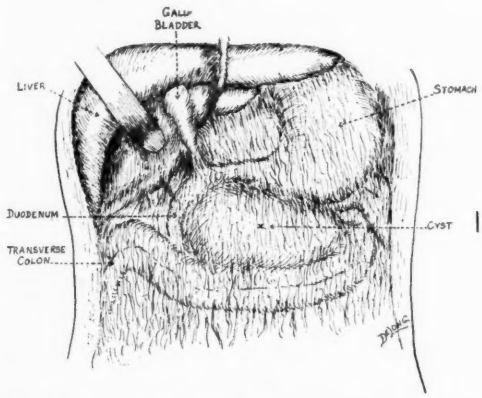

Fig. 2. Artist's concept of appearance of tumor at operation.

CASE REPORTS

Case 1: Female, white, age 42. She complained of fullness after meals, epigastric pain, occasional nausea and idiosyncrasy to certain vegetables. On examination, a movable fluctuant mass was palpated in the epigastrium. The mass filled the entire palm of the examiner's left hand. There was no specific tenderness elicited and the patient appeared too well for a carcinomatous growth of such magnitude. Furthermore, roentgenograms demonstrated the consistency of the tumor and its extra-alimentary tract location. Moreover, all laboratory tests referable to the pancreas and biliary system were negative. The diagnosis of a so-called "pseudo" pancreatic cyst could not be excluded. Surgery was apparent. The patient, however, was stunned on hearing her plight, and consulted several other surgeons before submitting to operation.

Through an upper left paramedian incision, a large cystic mass was found between the stomach and the transverse colon pushing the stomach upward and to the left (Fig. 2). On incising the cyst, approximately three quarts of a peculiarly brown-grey fluid were obtained, and at least a quart of a black-grey paste was scooped up from the base of the cyst. Further investigation revealed that it had two compartments, and on removing the putty-like substance from the second sac, an underlying vessel was injured, causing a distressing hemorrhage which filled the cavity and required careful packing with iodoform gauze before it could be arrested. Marsupialization of the sac was followed by a rugged postoperative course because of hemorrhage. Six months later the patient had completely recovered, and all drainage from the sinus had stopped.

Case 2: Female, colored, age 54. The patient was seized with severe epigastric pain which radiated to the left kidney area. There was some nausea but no vomiting. Examination revealed a mass in the left hypochondrium. A kidney tumor was suspected, but an intravenous pyelogram showed a normal kidney. There was however a definite ovoid mass (Figs. 3, 4), compressing the stomach. A diagnosis of splenomegaly was given by the radiologist, and the patient, apparently getting worse, was subjected to laparotomy.

After opening the abdomen, a retroperitoneal tumor was suspected, but it was soon apparent that

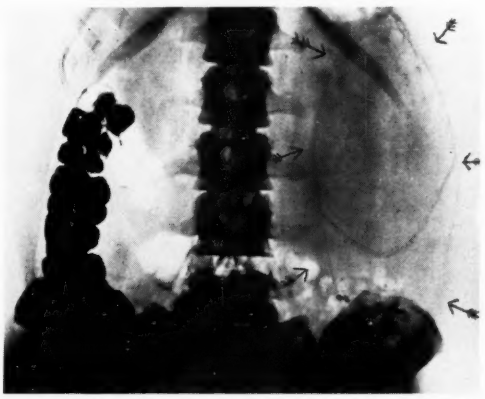

Fig. 3. X-ray view of so-called "pseudo" pancreatic cyst, anterior aspect; tumor originally considered an enlarged spleen.

the presenting cyst was of the so-called "pseudo" pancreatic type. The cyst was marsupialized after several quarts of a straw-colored fluid had been withdrawn and recovery ensued in six weeks' time.

Fig. 4. X-ray view of so-called "pseudo" pancreatic cyst, posterior aspect.

DISCUSSION

Although complete surgical extirpation is the ideal treatment for these cysts it is seldom possible to employ this method because of hazard to the surrounding structures and technical difficulties encountered. Marsupialization is the accepted practical manner of surgically dealing with them. Drainage from the sinus may seem interminable at times, and in order to eradicate the fistula, resort to various selerosing agents has been done. These include roentgen ray, radium, various mechanical and chemical agents, the effects of which are equally varied. Tincture of iodine, silver nitrate, and sodium salicylate solutions probably have been the most common agents employed. Recently frequent instillation of from 5 to 30 cc. acetone (20 percent to undiluted) has been suggested by Walker,[5] who believes it is more effective than any other substance. The solution is introduced by catheter into the marsupialization fistula and healing has been markedly promoted.

Internal drainage by anastomosing the cyst to the stomach, duodenum, jejunum, or gall bladder has been successfully accomplished. In 1923 Jedlicka[6] proposed this method by uniting the cyst to the stomach. Since that time the same principle has been adopted by different surgeons and different organs employed. But despite the number of reported successes the operation appears more as a surgical feat than of any practical advantage to the patient.

SUMMARY

1. Because of the anatomic features in the formation of so-called pseudopancreatic cysts, it is suggested that these cysts be referred to as fluid collections of a pathologic lesser peritoneal sac, particularly inasmuch as the pancreas may have only a remote cause-effect relationship.

2. It is believed that proper pathologic consideration should be given the omental bursa, and that the phrase "cystic omental bursa" may satisfactorily designate the disease entity.

3. Two new cases are presented and their operative correction is discussed.

4. Attention is directed to the use of acetone solution as an obliterating medium in hastening the closure of the marsupialization fistula.

RIASSUNTO

1. In base agli aspetti anatomici delle cosìdette cisti pseudopancreatiche e piu' specialmente ai rapporti patogenetici molto remoti con il pancreas, l'A. designa queste cisti quali raccolte fluide della piccola cavita' peritoneale.

2. Una speciale considerazione va attribuita alla borsa omentale. Il termine di borsa cistica omentale designa bene l'entita' morbosa.

3. Illustra due casi del genere, discutendo la cura operativa.

4. Richiama l'attenzione sopra l'uso di una soluzione di acetone onde obliterare piu' rapidamente la fistola residuante alla marsupializzazione.

SUMARIO

1. Los mecanismos anatomicos que contribuyen a la formacion de los quistes seudopancreaticos hacen que el autor sujiera su denominacion de colecciones fluidicas patologicas del saco peritoneal menor. especialmente cuando el pancreas tiene relaciones remotas con ellos bajo el punto de vista de causa y efecto.

2. Se cree que se debe de considerar en la patologia de estas colecci ones a la bolsa omental y por lo tanto la designacion de "bolsa omental quistica" es mas satisfactoria en la terminologia de esta entidad patologica.

3. Se han presentado dos casos nuevos y se discute la tecnica operatoria para su correccion.

4. Se dirige la atencion al uso de la solucion de acetona como medio obliterante de la fistula marzupializante enestos casos.

SOMMAIRE

1. Vus les caractères anatomiques determinant la formation de ces kystes designés pseudopancréatiques, il est suggèré que ces kystes soient envisagés comme des collections liquides d'un sac peritonéal pathologique, surtout parce qu'apparemment le pancréas ne joue qu'un role secondaire de causes ou d'effets à leurs égards.

2. L'auteur suggère qu'on donne une consideration adéquate aux bourses épiploïques et que la phrase bourse cystique omentale, désigne la maladie entière.

3. L'auteur présente deux cas et discute leur correction opératoire.

4. L'auteur attire l'attention sur l'emploi de solutions d'acétone pour hâter l'oblitération des fistules consécutives à la marsupialisation.

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Surgical Correction of Senescent Pendulous Cheeks

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THE DESIRE to look younger is entirely logical, human, and often is an economic and psychologic necessity.

Rhytidectomy is first credited to Gersuny (1899). Later, operations devised by Lexer (1906), Hollander (1912), Passot (1919) and Joseph (1921) were reported. Until today, their much modified technics are considered acceptable surgical procedures.

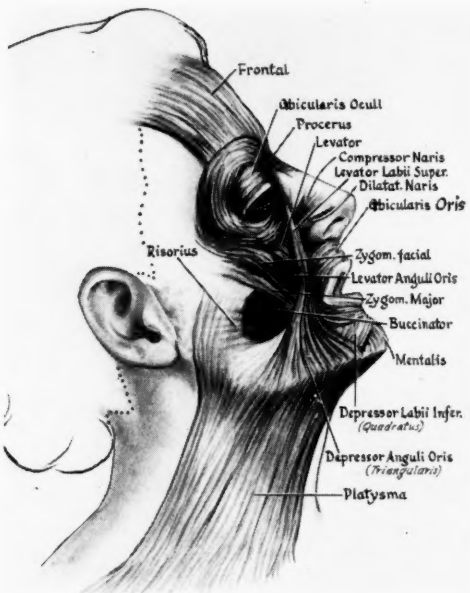

Fig. 1. Muscles of the face.

In operations designed for the obliteration of the effects of facial senescence the surgeon's plan for the correction must consider several distinct facial areas.

1. The forehead.
2. The glabella.
3. The upper lid.
4. The lower lid.
5. The cheeks.
6. The neck.

In carrying out the surgical correction the glabella is generally corrected with the forehead, the upper and lower eyelids are generally corrected together, and the cheeks and the neck are generally corrected in one operation. This paper is concerned with the cheeks and neck.

The etiology of premature facial senescence must be understood before surgical intervention is attempted. The facial contour is normally guaranteed fixedness and integrity by three broad rings of muscles. Two are the orbicularis oculae encircling the eyes. The third is the orbicularis oris, the thin band of muscle stretched around the mouth. All three muscle bands are held in balance with each other by the attachments of the other facial

Fig. 2. Direction of travel of facial skin causing pendulous cheeks.

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muscles, by their interplay, keeping them all in proper tonal balance.

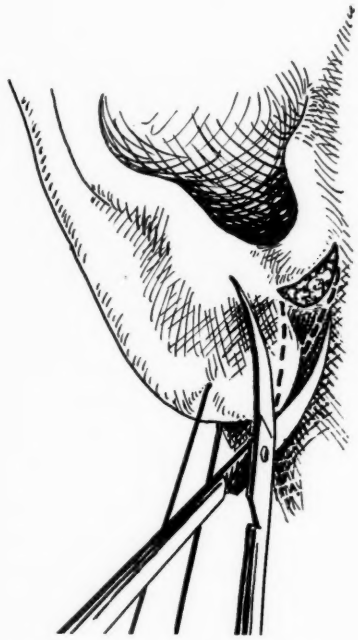

Fig. 3. Triangular crescent excised from anterior lobular edge to exaggerate acute lobular angle.

Another factor in the etiology of facial senescence is the atrophy or hypertrophy of the skin as age advances. As youth disappears an atrophy of the subcutaneous areolar tissue and of the glandular elements of the skin occurs. Simultaneously there is a diminution of muscle volume of the facial musculature.

Further, in considering the anatomy of facial senescence one must divide the face into three areas of vertical dimension. The first is the space from the hair line to the glabella, the second is from the glabella to the nasal columella and the third or lowest vertical dimension is from the columella to the inferior surface of the chin. It is in the lower third of the three vertical dimensions of the face where the advancement of age is most graphically made evident.

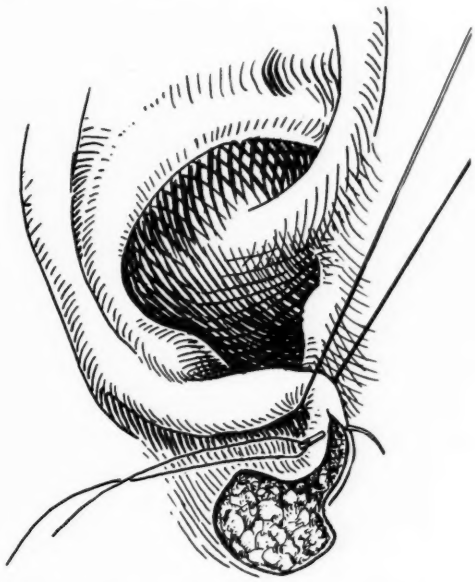

Fig. 4. Lobular incision sutured insuring postoperative lobular integrity.

As age approaches a few teeth are lost. The remaining molars are ground down by mastication and well known dental phenomena occur. There is some absorption and diminution of the size of the mandible and the anterior upper and lower incisor teeth tend to deviate their occlusal surfaces anteriorly. Thus there is loss of vertical dimension of the lower third of the face.

With these anatomical changes the masseter muscle loses tone, and the loss of vertical dimension plus the atrophy of the subareolar connective tissue results in the accentuation of the nasolabial fold and the skin of the cheek becomes pendulous.

The zygomatic major muscle which is attached to the lateral corner of the orbicularis oris loses length and mobility. As it becomes more fixed it causes characteristic folds near the mouth. The platysma muscle loses tone and becomes more fibrous and the skin below the chin may "double," if the person is fat, or become redundant, if the individual is thin.

The amount of skin to be removed is best

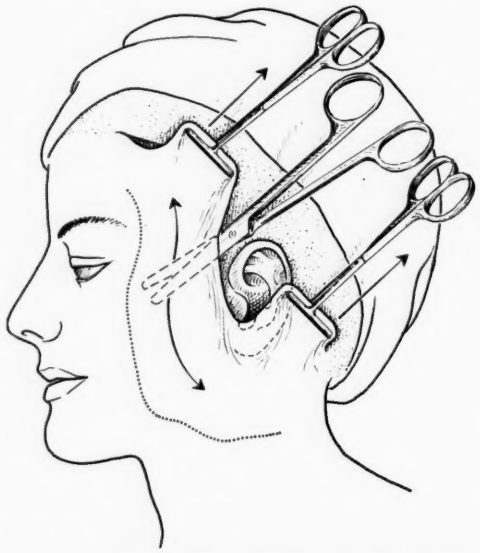

Fig. 5. Undercutting above fascia while skin is rotated posteriorly and superiorly. Arrows indicate direction of traction.

Fig. 6. Incision to correct pendulous cheeks.

judged with the patient in the upright position. The skin of the cheeks is drawn backward and upward with the fingers, and the appropriate areas for excision are marked with a dye. If the skin is drawn too tightly, the nasolabial fold is entirely obliterated. This tautness lends a distorted appearance to the mouth.

The incisions are made inconspicuous by concealing them as much as possible in the hairline. The incisions of the angle of the ear are concealed by the overhanging ear lobe.

The patient's hair is shaved in the temporal area, and behind the ears. A wide strip of adhesive bandage is laid along the surgical area border so that the hair does not intrude into the surgical field. The face and adhesive strips are painted with a mercurous antiseptic.

The surgery is conducted with a one percent novocaine with adrenalin anesthetic. The needle is inserted into the ear lobe, then follows the line of projected incision. From this line, the anesthetic is injected anteriorly toward the outer canthus and to the nasolabial fold, halfway to the chin, along the body of the mandible and along the sternocleidomastoid for several inches.

A triangular section of the ear lobule is excised as illustrated, and the lobe resutured. This is to accent the curvature of the ear lobe against the slight tension to which it will be opposed later. The incision is then carried upward along the anterior edge of the auricle and into the hair area and forward and upward into the temporal area. The posterior limb of the incision passes under and posterior to the ear, in the postauricular sulcus. It passes into the hair line above the level of the tragus.

The margins of the skin to be resected are grasped with forceps along the entire incision. Lahey, Allis or Kocher forceps or towel clips may be used. The skin is undermined as extensively as the particular need indicates. Generally the undermining is carried near

A B C

Fig. 7 A. Closure of temporal and circumauricular incisions. B. Temporal (Ehrenfeld) incision for pendulous cheeks suitable for early rhytidectomy, especially when teeth have lost no vertical dimension and pendulousness is limited to upper cheek. C. Closure of temporal incision.

Fig. 8. Left. Pendulous cheeks before nasal plastic correction and bilateral rhytidectomy. Right. Profile view after nasal correction and bilateral rhytidectomy.

Fig. 9. Left. Front view before surgery. Right. Front view after surgery.

to the outer canthus, the undermining radiating to the nasolabial fold and over the sternocleidomastoid. The undermining operation is confined above the fascia.

By protecting the fascia, the temporal branches of the facial artery, nerve, and vein are uninjured. Further, the fixation or anchor sutures are more effective with an undisturbed fascia.

The anchor sutures are placed as follows:

1. Canthus area toward temporal area.
2. Nasolabial area toward the auricle.
3. From along the body of the mandible toward the ear lobe.
4. From along the sternocleidomastoid area toward the postauricular sulcus.

We formerly used chromic catgut for anchor sutures. Now, we find linen and cotton sutures more effective.

Once the fixation of the fascia is completed, the forceps are pulled upward and backward, drawing the skin over the ear, until the face is smooth, but not artificially taut.

With the skin now repositioned, being literally rotated upward in the direction of the temporal area, and backward toward the auricle, the resection may proceed. While the skin is held in its new position with the forceps, under tension, the excess skin is trimmed away with scissors. The excision is most wisely begun at the critical lobule area. It proceeds forward up toward the temporal area, then posteriorly along the postauricular sulcus.

After four or five lineal cm. are excised, the suturing of the skin should commence, beginning at the lobule. As the first few centimeters are sutured anteriorly along the auricle, the excision is extended ahead of the skin sutures, preceding it as the suturing progresses. Skin closure may be with fine sutures,

Fig. 10. Left. Front view before surgery. Note overhanging upper eyelids and premature jowls. Right. After bilateral rhytidectomy. New, youthful appearance and greater aesthetic appeal is apparent.

interrupted or mattress type. Either cotton, nylon or steel may be used. All are satisfactory. The incisions are protected with a wrap-around pressure bandage, with the ears adequately padded.

The operation is not completed until one is sure that there is no bleeding. Hematomas are to be guarded against.

RIASSUNTO

La ritidectomia e' un'operazione rivolta a correggere le impronte della vecchiaia sulla faccia. L'A. discute i fattori che influiscono sulla senescenza precoce della faccia: descrive la tecnica operatoria per correggere la discesa delle guancie e del mento: rileva l'importanza che assumono talune precauzioni sopra la riuscita estetica dell'operazione.

SUMARIO

La ritidectomia es una operacion que se practica en la correccion de la senesencia de la mejilla. Se han discutido los factores etiologicos responsables de la senesenc la facial prematura y la tecnica operatoria que se usa en la correccion del prolopso de la mejilla y del menton. Se indica ciertas medidas necesarias para obtener resultados esteticos satisfactorios.

SOMMAIRE

Cette opération est employée pour oblitérer la sénescence de la figure. Les facteurs étiologiques de la sénescence faciale prématurée sont discutés et la technique chirurgicale pour la correction des joues pendantes et du menton est décrite. Certaines précautions sont à prendre pour assurer un bon résultat esthétique.

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Pentothal Sodium Anesthesia in Major Surgery
Application, Administration, Dosage

D. L. RATER, M.D., F.A.C.S., F.I.C.S.
OTTUMWA, IA.

PENTOTHAL sodium anesthesia, while by no means unfamiliar today to most surgeons, is still new enough that there may be many who would welcome the opportunity to learn more of its use than their own experience shall have taught them, together with some data regarding routine procedures and precautions to be observed when using it. There is also, in some quarters, insufficient knowledge of certain other medicaments that may, or in some instances, must, be used in connection with it. It is the purpose of this paper to cover some of these points.

Two persons are chiefly concerned with any anesthetic—the surgeon and the patient. The surgeon seeks an anesthetic material which will give prompt and complete relaxation without undesirable side effects and without postoperative nausea or toxicity. The patient desires freedom from the sensation of suffocating while "going under" and from the postoperative misery so familiar until very recent years to everyone who underwent major surgery. Pentothal sodium anesthesia has earned the reputation of being this sort of anesthetic material. Surgeons who have used it, find it fulfills their most exacting requirements in all forms of surgical procedures, including Cesarean section. Patients who have experienced it, or who know other persons who have done so, often specifically request it.

For nearly three years, I personally have used pentothal sodium anesthesia exclusively for all my major surgical operations, as well as for many minor ones. Used either alone or, upon occasion, in conjunction with curare (intocostrin), it has been found to give rapid, adequate anesthesia and relaxation during operation, and to reduce materially the hazards and difficulties of the postoperative period, allowing as it does, much earlier resumption of normal feeding, thereby reducing to a minimum dehydration and intoxication during early convalescence. Approximately 92 percent of the patients operated upon during this period experienced *no* postoperative nausea or vomiting.

However, as with any anesthetic material, pentothal sodium must be thoroughly understood by both the surgeon and the anesthetist, both in order to make full use of its possibilities and to avoid its dangers. Especially is this true when other medicaments are to be used with it. Such medicaments include curare, coramine, metrazol, adrenal cortex extract, picrotoxin and, less frequently, the sulphates of caffeine and ephedrine. The application of these adjuvants and their properties will be discussed farther on in this paper.

PREOPERATIVE ROUTINE

Except when emergency makes it impossible, it is most desirable that the patient be admitted to the hospital far enough before the scheduled time for operation to permit not only adequate physical and mental preparation of the patient himself, but also for full and complete history and observation, as well as physical, laboratory, and where indicated, roentgenographic, examinations. This is especially important in the case of elderly or very young patients, the debilitated, anemic, diabetic, cardiac and other poor-risk patients, or those who, for any conceivable reason, might be capable of precipitating any sort of crisis in the operating room or after.

Where dictated by the results of examination, every means must be used to bring the patient to the best possible condition before subjecting him to surgery. Bed rest, administration of extra fluids, attention to elimination, administration of vitamins, whole blood, intravenous glucose (five or ten percent in normal saline), drolan, amino acids, liver extract, etc., all assist greatly under various circumstances, to this end. If there is a tendency to flatulence, only fluid should be given for twenty hours before surgery, with nothing by mouth after midnight. Except where ap-

pendicitis is suspected, a saline laxative such as phospho-soda fleet, two tablespoons in eight oz. warm water, may be given at 4 P.M., repeating at 10 P.M. if necessary. A warm enema of normal saline may be given three hours before the scheduled time for operation. If there is evidence of persistent flatus after this, one ampoule prostigmin, 1/2000, may be given one hour later, repeating in an hour if needed. A colon tube or dumbbell may also be of assistance to the nervous patient.

Seconal, grs. 1.5, or some similar preparation, should be given at bedtime, the night before operation, to allay restlessness or anxiety. One hour before operation, morphine sulphate, gr. 1/6, with atropine sulphate, gr. 1/150, should be administered routinely, except in the case of women undergoing Cesarean section. In these latter, as well as in the very young, the aged and those markedly debilitated, the effects of morphine and atrophine are prohibitively depressing to respiration. Other drugs and evacuants also may be used, routine caution, of course, being exercised in their application.

Patients thus prepared, come to the operating table with a flat abdomen, free of all gaseous distention and without the dangers of trauma to the viscera and of shock that otherwise might so easily prejudice their convalescence.

ANESTHETIC TECHNIC

Necessary Equipment:

1. Gas machine (calibration allows administration of known quantity of oxygen at all times.)
2. Sterile towels.
3. Ethyl alcohol, sterile cotton, gauze pads.
4. 20-gauge needles, 3 or more.
5. Arm board (well padded, preferably attached to table).
6. Rubber tubing; 2 lengths, one 6 inches, one 30 inches long.
7. Vacodrip, Baxter Murphy drip bulb.
8. Screw-controlled clamp.
9. Tourniquet.
10. Airways; 1 oral, 1 nasal, 1 tracheal.
11. Glass observation tube, beveled to fit 20-gauge needle.
12. Medicine glass.
13. Tongue clamp.
14. Syringes with 18-gauge needle, I 20-cc., 1 30-cc.
15. Flask normal saline (triple-distilled water).
16. Salvarsan flask, graduated, 500 cc.
17. Pentothal sodium powder, 1-gr. ampoules.
18. File.
19. Hemostat.
20. Metrazol, coramine, adrenalin chloride, adrenal cortex, picrotoxin, prostigmin, curare, etc. (sufficient quantities for emergency use).
21. Adjustable standard with two holders (for administration of solutions or of blood).

The mechanism for administering the anesthetic is made-up in the following manner:

Suspend the salvarsan tube from one arm of the standard by a strip of gauze bandage. To this attach successively the six inch length of tubing with the screw-clamp affixed, the vaco-drip Baxter Murphy drip bulb, the 30-inch length of tubing, the bevelled observation tube and a 20-gauge needle. Cover the mouth of the salvarsan tube with sterile gauze.

To prepare the pentothal sodium solution for use (all procedures being executed under complete asepsis), file an ampoule (1 gr.) of the powder at the base of the neck of the tube. Sterilize the upper half of the ampoule in alcohol and remove the top in the usual manner. Add enough normal saline solution to dissolve the powder with a little stirring; or place the powder in a wine glass and dissolve in a like manner. (The use of saline prevents hemolysis.)

Partially fill the salvarsan tube with saline solution and allow all air bubbles to escape from the entire linkage below the tube. Add the prepared pentothal sodium solution and add enough more saline to make 100 cc. This reduces the strength of the solution to one percent—the desired concentration for starting the anesthesia.

Administration: With the patient comfortably placed on the operating table, blankets properly secured and the blood pressure bag in position on the right arm, the forearm is placed in a padded arm-holder on the side of the table. A padded arm board is attached

to the left side of the table perpendicularly, with the patient's arm snugly secured to it by a five-foot length of four-inch-wide muslin. A loop of the muslin is placed over the wrist and drawn snug, the loose ends being passed down over the arm-board, opposite to each other, brought up over the palm of the hand and tied. In individual cases, the general procedure sometimes needs to be altered; the point to be borne in mind is that the flexor surface of the arm should be upward, the arm being firmly fixed and comfortable, as well as convenient for the anesthetist to undertake

Venipuncture: This is usually made into the *vena mediana cubiti* although any prominent vein will serve. In some instances, where all the veins of the arm are small or cannot be located, a vein in the foot or lower leg may have to be substituted, in which case the procedure indicated in the preceding paragraph will, naturally, have to be altered to fit individual need.

A tourniquet is slipped around the left arm just above the elbow and the veins allowed to distend by the usual means. The area over the chosen vein is cleansed with alcohol and the needle inserted. When back pressure of blood is noted in the observation tube, the tourniquet is loosened and the anesthetic solution allowed to flow. It is wise to turn the long side of the needle to parallel the intima of the vein (the bevel being toward its center) to allow unobstructed flow of the solution.

In some cases, it may become necessary to make a "blind" venipuncture, which, if the anesthetist knows his anatomy will not prove too difficult. The only danger is that of entering an artery instead of a vein. Arterial pressure would make it impractical to attempt to administer an anesthetic by this route.

Having established satisfactory flow into the vein, the screw-clamp is adjusted to allow a flow of approximately 60 drops per minute of the anesthetic solution. This rate of flow is allowed to continue for about two minutes or until all reflexes have disappeared, with close observation centered on the patient. Stroking the eyelashes or pulling the tongue forward and inserting a tongue blade into the pharynx, are useful tests for this purpose.

In certain poor risk patients, the elderly, the very young, the debilitated or in extremely nervous persons, more time will generally be required to attain the necessary depth of anesthesia. Metabolism must be carefully considered in such patients. While some will do perfectly well on the usual rate of 60 drops per minute, in others this should be reduced to 45 drops per minute or less. This again is a matter which only thorough knowledge and long experience on the part of the anesthetist may dictate.

As soon as all reflexes have disappeared, a tracheal tube may be inserted to assure smooth breathing; or the airway may be placed through the mouth or the nares into the pharanx. *Free and unobstructed breathing at all times is an absolute necessity.*

An oxygen mask is now secured in place and oxygen allowed to flow at from 300 to 500 cc. per minute, depending upon individual requirements. While this is being done the patient is draped, the operative site prepared and the surgeon is ready to make his first incision. If the patient shows no reaction to this latter manoevre, the flow of anesthetic may now be reduced to 45 drops (¾ of one percent), 30 drops (½ of one percent) or 15 drops (¼ of one percent) per minute, depending upon the demands of the individual for maintenance of adequate anesthesia.

During the course of the operation, the amount of respiratory depression serves the anesthetist as an accurate guide to the depth of the anesthesia. Too high concentrations can cause complete cessation of breathing and bring about speedy death.

Should the patient cease to breathe, artificial respiration, together with the administration of additional oxygen and cardiorespiratory stimulants, must be instituted at once. Even when a patient appears deeply cyanotic, and breathing has ceased, the heart continues to beat for a certain length of time; often a few strong, deep, regularly spaced compressions of the chest are all that will be needed to reestablish normal respiration.

If the patient does not respond *promptly*, one or all three of the following drugs, coramine, metrazol or picrotoxin, should be administered. For experiments upon animals, as well as in certain cases of operating room crises reported in recent literature, give evidence that a delay in reëstablishing respiration

of no more than two or three minutes may cause permanent injury, while five minutes or more mean nearly certain death.

Intravenous pentothal sodium has been shown to have little or no effect upon the action of a normal heart. However, there is definite danger if cardiac decompensation be present, the danger being proportionate to the degree of disability. The patient's blood pressure normally falls as soon as a small dose of pentothal sodium is given, but soon returns to normal. After the anesthetic has been in progress for several minutes, vasodilation occurs together with a rise in the temperature of the extremities.

The appended table, representing cases chosen at random from my surgical practice, gives a fair cross-section of the ages of patients, the length and type of operations and other pertinent data, in connection with which pentothal sodium anesthesia was used. (Table 1.)

ADJUVANTS

Curare: This drug is prepared from an extract of *chondodendron tomentosum*, a crude preparation of which was first used by South American Indians for hunting wild game and stalking their enemies from ambush. It was first introduced in 1942 as an adjuvant in anesthesia to produce controlled degrees of relaxation needed by surgeons. Muscular relaxation is often a prime requisite to a successful operation. To attempt to obtain it by increasing the depth of anesthesia alone may endanger the patient's life, or, at the least, provoke additional postoperative complications.

Adequate preoperative preparation can usually eliminate this complication, but in cases of emergency, where time is at a premium, a drug to produce relaxation without dangerously deepening anesthesia, is often needed. Such a drug is curare.

In the usual dosages, the effect of curare is to relax the skeletal muscles peripherally. The muscles of the head and neck are the first to be affected, next those of the abdomen, then the extremities, and lastly, the diaphragm. It is this order that makes its use so valuable. Overdoses paralyze the muscles of respiration and cause death. In controlled doses, relaxation is produced where needed, without respiratory embarrassment. It is not an analgesic; it simply produces relaxation.

I do not use curare routinely, although many capable surgeons do. Where it is needed for the average patient, an initial dose of 60 units, given either intravenously or intramuscularly, usually serves. In toxic, debilitated or other poor risk patients, the initial dose should be no more than 20 units (1 cc.). In extremely lengthy operations, supplementary injections of one or two cc. may be needed to maintain the desired degree of relaxation.

When curare is being used, the amplitude, rate and character of the respiration must be observed with great care, as overdosage will show up immediately in the breathing. Should the patient show any signs of being overcome, prostigmine, 1/2000 should be administered in one or two cc. doses.

When used in conjunction with pentothal sodium anesthesia, the amount of anesthetic required is somewhat reduced. This in turn, means that the patient wakens after surgery, even more promptly, often in from 15 to 20 minutes.

Coramine: (pridine-beta-carboxylic acid and diethylamide). This drug is a proven cardiac, central nervous system and respiratory stimulant. Therapeutically, it is a specific in nicotinic acid deficiencies such as pellagra. As a peripheral stimulant, coramine acts directly upon the heart, lungs, respiration, circulation and muscle tone. It is mediated through the medullary centers in the central nervous system. Increased respiratory volume will be noted approximately 20 seconds after parenteral injection, particularly when respiratory depression has been produced by morphine sulphate.

Coramine increases the blood pressure and produces dilation of the coronary vessels. When administered intravenously, it increases muscular pressure and restores intravenous pressure in shock or massive hemorrhage. Its toxicity is low; it shortens narcosis.

When needed, it may be given in three to five cc. doses; in respiratory paralysis, an initial dose of 10 or 15 cc. is given immediately, followed by other methods of resuscitation.

Metrazol: (pentamethylenetrazol-$C_5H_{10}N_4$). This drug is a white, tasteless, crystalline,

neutral, stable substance, readily soluble in water. It is a respiratory and circulatory stimulant. It may be used in conjunction with other cardiac drugs. It is used in sudden circulatory failure and cardiovascular collapse, also to sustain circulation in chronic cardiac insufficiency, in depression due to infectious diseases, in shock, asphyxia neonatorum and in depression due to other drugs. It may be given with ephedrine or digitalis. It increases the depth and rate of respiration, but does not have the exciting effect of caffeine. It increases the exchange of CO_2 and oxygen in the lungs, thus improving pulmonary ventilation with consequent immediate improvement of the patient's condition.

One ampule should be administered when needed; the dose may be repeated in one-half to two hours without cumulative effect. Administration must be slow so as to avoid the production of convulsions.

Adrenal Cortex Extract: Containing the cortical elements of the adrenal glands which are essential to life, adrenal cortex extract maintains electrolytic and fluid balance between the circulating blood and the tissues, and assists carbohydrate metabolism. Also stabilizing blood pressure and restoring blood volume to normal levels, it serves as a buffer in surgical procedures, against shock, physical injuries and nervous excitement. Given in physiologic doses, the normal renal threshold for urea, potassium and sodium with resulting decrease in non-protein nitrogen and potassium and increase in blood sodium is restored. Its use is specifically indicated in Addison's disease; with these patients, its use is imperative, as otherwise they are very poor surgical risks.

It is supplied in 10 cc. rubber-capped, sterile vials, to be administered intravenously, intramuscularly or subcutaneously. The dosage is governed by the clinical response; the initial dose is 1 or 2 cc. During a crisis the dosage may sometimes be increased to as much as 40 or 50 cc. It should be included routinely in any intravenous fluids given postoperatively.

Picrotoxin: This is indicated in barbiturate poisoning. It stimulates the central nervous system; if given in excessive doses, it will produce convulsions. As an antidote to the barbiturates, it is nearly perfect, each successfully counteracting the fatal effects of the other—1 cc. represents 3 mg. of the drug. The initial dose should be 2 cc., given intravenously. Should the response be unsatisfactory after 15 minutes, a second dose of 3 or 4 cc. may be given; however, an additional dose is only rarely necessary.

If, through some error in judgment, the patient is found to have received an overdose —as evidenced by muscular reaction—1½ to 3 gr. pentobarbital sodium should be given as an antidote.

Other medicaments which may be needed with pentothal sodium anesthesia include ephedrine sulphate, which may be given in doses of ⅜ gr. (0.025 Gm.) to elevate blood pressure; and caffeine sodium-benzoate which is given in 7½ gr. (0.05 Gm.) doses as a stimulant.

SPECAL PRECAUTIONS

In conclusion, there are certain points which require special emphasis, even at the risk of reiteration. Before any patient is subjected to an anesthetic and major surgery, it is imperative that both surgeon and anesthetist have the fullest possible knowledge of everything in his circumstances that might possibly have any bearing on his well-being during and following the operative procedure. That this seemingly self-evident truth should need repeating is amply borne out by the case records of even some of our finest hospitals.

Obtaining such knowledge begins of course with the history and the routine examinations. Points of especial importance are the patient's age, his state of nutrition, debility or obesity if present, the complete blood picture, the state of function of the heart and kidneys, and the presence or history of toxemia, excessive nervousness (look into its causes) or alcoholism. The metabolic status of the patient should be known.

The patient's mental attitude toward his own prospects, and especially his outlook on the anesthetic are especially important. If he is pessimistic towards his prospects of survival, he will be a poorer anesthetic risk, and everything possible must be done to improve his outlook and gain his confidence. In extreme cases, it is not too much to say that the risk

TABLE 1.

Patient	Sex	Age	Nature of Operation	Length of Operation	Blood Pressure (Systolic)	Pulse
F. H.	M	61	Ureterolithotomy	77 min.	High—140 Low —132	High—88 Low —45
S. M. B.	M	76	Colostomy	82 min.	High—162 Low —151	High—109 Low —98
E. V.	F	56	Cholecystectomy, appendectomy	60 min.	High—132 Low —114	High—88 Low —78
G. S.	M	7	Appendectomy	42 min.	High—142 Low —127	High—93 Low —82
B. L.	M	14	Appendectomy	32 min.	Steady at 121	High—134 Low —126
M. C.	F	29	Total Hysterectomy	90 min.	High—132 Low —112	High—82 Low —64
F. S.	M	82	Prostatectomy	49 min.	High—122 Low —102	High—82 Low —64
M. C.	F	85	Gastroenterostomy	92 min.	High—151 Low —122	High—102 Low —84
A. M. N.	F	69	Postoperative Strangulated Ventral Hernia, Strangulated Femoral Hernia	137 min.	High—160 Low —150	High—82 Low —64
L. R.	F	39	Cesarean Section	64 min.	High—130 Low —121	High—82 Low —63
A. D.	F	40	Thyroidectomy	72 min.	High—151 Low —121	High—93 Low —74
F. M.	M	6	Sebaceous Cyst	36 min.	High—130 Low —120	High—98 Low —82

TABLE 1.—*Continued*

Resp.	Pentothal Sodium Concentration in %	Adjuvants		Remarks
		Drug	Amount	
Steady at 18	1% throughout	Corimine Adrenal Cortex Metrazol	 3 cc. 2 cc.	Pulse rate rose steadily throughout procedure; B. P. fell, rose and fell again.
High—22 Low —14	1½% throughout	Corimine Adr. Cor. Metrazol	 5 cc. 3 cc.	B. P. dropped, then held steady throughout procedure.
High—18 Low —15	1¼% throughout	Coramine Adr. Cor. Metrazol	1.5 cc. 3 cc.	B. P. rose rather steadily; pulse rose rapidly then steadied, throughout oper.
High—22 Low —12	1¼% throughout	Metrazol	1 cc.	B. P. fell then rose slightly; pulse rose then steadied.
High—22 Low —16	1-1-2-¼%	Metrazol	1 cc.	B. P. fell steadily, slowly.
Steady at 18	1% throughout	Coramine Adr. Cor. Metrazol	1.5 cc. 6 cc. 1.5 cc.	B. P. and pulse rose steadily throughout procedure.
Steady at 18	1-3-4-½-¼%	Metrazol	3 cc.	B. P. fell unevenly, then rose; pulse rose unevenly throughout procedure.
High—27 Low —15	3-4-¼%	Coramine Metrazol	2 cc. 1 cc.	B. P. rose rapidly between extremes, then steadied at 140.
High—22 Low —15	1-¼%	Coramine Adrenal Cortex Metrazol Picrotoxin	1.5 cc. 5 cc. 2 cc. 1.5 cc.	B. P. held steady for 1st 50 minutes, then rose 10 points for next hr., then returned to original value.
High—29 Low —18	1-¼%	Coramine	1.5 cc.	B. P. rose between limits at end of 1st 20 minutes.
High—22 Low —12	1% throughout	Coramine Lugol's Metrazol	1.5 cc. 60 drops 1 cc.	B. P. rose rapidly, steadied, rose again, then fell.
High—22 Low —17	1% throughout	Metrazol	1 cc.	B. P. fell, then rose slightly; pulse rose rapidly, then steadied.

entailed in delaying or even cancelling an operation entirely is less than the risk in performing it when the patient's mental attitude is unduly depressed.

The present or past use of drugs, alcohol and even tobacco can have a definitely prejudicial effect, especially upon the length of convalescence. So also can malignancy, diabetes or recent hemorrhage. When known, these can be duly taken into account and their dangers greatly reduced by judicious handling before and during surgery.

Knowledge of hepatic function is extremely important as detoxification takes place through the liver. Though pentothal sodium, unlike many anesthetic materials, has little, if any, disturbing effect upon liver function, it is well to build up the glycogen reserves of a liver known to be impaired, by a high carbohydrate diet prior to operation. Similarly, patients suffering from obstructive jaundice, should receive vitamin K and whole blood.

In the same way precautions should be taken against the effects of impaired heart or kidney function, especially in the aged. For renal insufficiency be sure that urea, non-protein nitrogen and creatinine determinations have been done; in circulatory abnormality, especially decompensation accompanied by dysponea, with or without coronary disease, the use of adequate oxygen during anesthesia is especially imperative. If respiratory embarrassment is at all marked, helium should be given with the oxygen, as this seems to assist greatly in opening and inflating the air sacs of the lungs. It should also be noted that oxygen, 100 percent, given postoperatively, seems to reduce flatulence to a minimum.

Where pneumonia, effusion, pleurisy or tuberculosis exist, the risk, is of course, proportionately greater and surgery should be delayed if at all possible. Yet even in these dire situations, the effects of pentothal sodium anesthesia seem to be less deleterious than those of other anesthetics. An intercurrent cold or subacute bronchitis or some similar condition, though not conducive to the best surgical results, does not contraindicate surgery in an emergency, for again pentothal sodium intravenously, in the indicated percentages, has no demonstrable untoward effects.

CONCLUSIONS

1. Intravenous pentothal sodium, administered by the continuous drip method and reduced from an initial 1 percent, successively to ¾, ½ and ¼ of 1 percent, is an adequate anesthetic in major surgery, usually without any other anesthetic material as an adjuvant.

2. It is safe and simple to administer, providing sufficient relaxation, with little or no postoperative toxemia, dehydration or nausea.

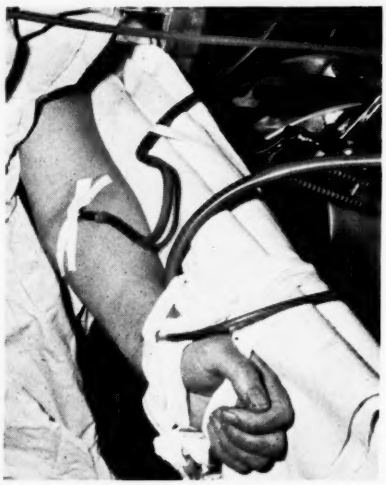

Fig. 1. The patient's arm suitably secured and the apparatus for intravenous administration of the anesthetic material, as well as plasma or other supportive solutions, in place.

3. Patients who know of this anesthetic frequently request it.

4. It may be used even for lengthy (two to three hours) procedures without ill effect.

5. The anesthetist has complete control over the administration of this material at all times and may govern it accurately according to the individual needs of the patient.

SUMMARY

Having used intravenous pentothal sodium anesthesia in all of his major surgical procedures and many minor ones over a period of three years, the author concludes that this is the best and most satisfactory material with which he is familiar. The advantages and importance of adequate and suitable preopera-

tive preparation of the patient, has been outlined. Also the details of anesthetic technic with this material, plus a brief resumé of the medicaments, especially curare, which under certain conditions, may advantageously be used in conjunction with it, has been given. In conclusion a warning regarding special hazards, such as cardiac or renal insufficiency, for the surgical patient, with this, as well as any other anesthetic material, has been presented.

RIASSUNTO

Avendo operato per tre anni tutti i casi di grande, e molti casi di piccola chirurgia con quest'anestesia endovenosa, l'A. se ne dichiara un convinto fautore. L'A. discute i vantaggi su altri metodi di anestesia: illustra i diversi procedimenti e le svariate precauzioni preoperatorie: descrive la tecnica dell'anestesia semplice o combinata con l'uso di altri medicamenti, come il curare, utili in taluni casi. Certi pericoli, comuni ad altre anestesie, sono naturalmente inevitabili: specialmente quelli inerenti ad un'insufficienza cardiaca o renale.

SUMARIO

Debido a su experiencia de mas de tres anos con la anestesia intravenosa por el pentotal sodio en procedimientos de cirujia alta y menor, el autor concluye que este anestetico es el mejor y mas satisfactorio de los que el ha tenido experiencia. Se ha presentado un resumen de sus ventajas y de la importancia de la preparacion pre-operatoria para obtener los mejores resultados. Tambien se presenta la tecnica usada en la administracion de este anestetico y de otros medicamentos, especialmente el curare, y cuyo uso es ventajoso en ciertas condiciones.

En conclusion el autor apunta el peligro para el paciente de ciertas complicaciones de este anestetico, tal como la insufiencia cardiorenal, y que tambien pueden ocurrir con otros anesteticos.

SOMMAIRE

Durant les trois dernières années l'auteur fait un usage exclusif de l'anesthésie intraveineuse à l'aide du pentothal-sodium pour les grandes ou petites opérations, Rater est d'avis que cet agent donne les résultats les plus satisfaisants que l'on connaisse. Les avantages et l'importance d'une préparation préopératoire adéquate et soignée du malade sont décrits. L'auteur nous donne les détails de sa technique d'anesthésie et nous résume en détail les médicaments qui, dans certaines conditions peuvent être employés avantageusement avec le pentothal-sodium. Il nous énumère les hasards de l'emploi de pentothal-sodium ou de tout agent anesthésique dans les cas d'insuffisance cardiaque, rénale ou hépathique.

Urinary Bladder Obstructions in Children

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SINCE the opening of the Nazareth hospital in 1940, 11 children have been operated upon for urinary bladder obstruction. These children varied in age from eight months to 14 years, and were all white and male, except for one female. The etiological factors were: urethral stricture, two cases; large ureterocele, one case—the girl; and vesical neck obstruction, eight cases.

The pertinent facts relative to the management of these conditions furnish the data for this report.

STRICTURE OF THE URETHRA

Case 1: D. D., male, 15 years old. He was admitted January 6, 1941, complaining of hematuria with frequent, painful, difficult urination. He said that at the age of three he had acute retention of urine due to a congenital urethral stricture. An operation performed at that time had resulted in a hypospadius extending along the entire pendulous penile urethra. The urine contained a trace of albumin and many leucocytes. Blood studies showed hemoglobin, 71 percent; erythrocytes, 4,020,000; leucocytes, 8,500; urea nitrogen, 15 mg. percent. Small stones in the bladder and posterior urethra were demonstrated by roentgenograms and intravenous urography revealed bilateral hydronephrosis with dilated tortuous ureters.

The stones were removed through a suprapubic cystotomy and later the stricture at the bulbomembranous junction was divided through an external urethrotomy. The urinary symptoms were relieved but the boy refused operation for correction of the penile deformity.

Case 2: R. D., male, 14 years old. The patient was admitted February 9, 1947 complaining of hematuria, severe dysuria and urinary frequency. The duration of the symptoms was given as two months. Blood studies showed hemoglobin, 90 percent; erythrocytes, 4,570,000; leucocytes, 7,500; urea nitrogen 15 mg. percent. The urine was alkaline and contained albumin and many red and white blood cells. Intravenous urography disclosed absent left renal function with marked hydronephrosis and hydroureter on the right (Fig. 1).

Cystoscopy could not be done because of a stricture of the urethra about 3 cm. beyond the meatus. Filiform guides could be passed through the stricture but would impinge in the region of the deep urethra and it was thought that vesical neck obstruction existed.

A suprapubic cystotomy was performed and it was found that the vesical area was occupied by a large diverticulum separated from the compressed bladder by an orifice at the base in the mid-trigonal area (Fig. 2).

A filiform guide was passed through the orifice into the compressed bladder and through the internal vesical outlet. Flexible followers were fitted to the end of the guide and pulled through the strictured urethra. A urethral catheter was then inserted and the wound closed around a suprapubic tube. The patient was able to void after removal of the tube but the operative sinus continued to drain. Despite urethral dilatation the greater portion of the urinary output came through the abdominal sinus. Therefore it was deemed best to do a right cutaneous ureterostomy.

BLADDER OBSTRUCTION DUE TO A LARGE URETEROCELE

Case 3: M. V., female, 9 years old. She was admitted August 3, 1947, and complained of difficulty in urination, constant pain in the right lower abdomen and occasional less severe pain in the left lower quadrant. Also she was subject to frequent attacks of fever. The symptoms had originated about three years before admission at which time a urological examination including cystoscopy and intravenous urography was reported negative.

The urine contained a trace of albumin and many leucocytes and culture revealed E. Coli. Blood studies showed hemoglobin, 79 percent; erythrocytes, 4,250,000; leucocytes, 6,400; urea nitrogen, 11 mg. percent.

Intravenous urography disclosed some delay in excretion bilaterally with a double left kidney showing some hydronephrosis in the lower half. On the right there was a normal shadow of pelvis and calyces of a single kidney (Fig. 3).

At cystoscopy a mass was found in the bladder. It seemed to be mostly on the left and covered the trigonal area. A diagnosis was made of the left ureterocele.

The operation revealed that the mass arose from the right near the ureteral orifice, extended to the left across the floor and up the lateral wall of the

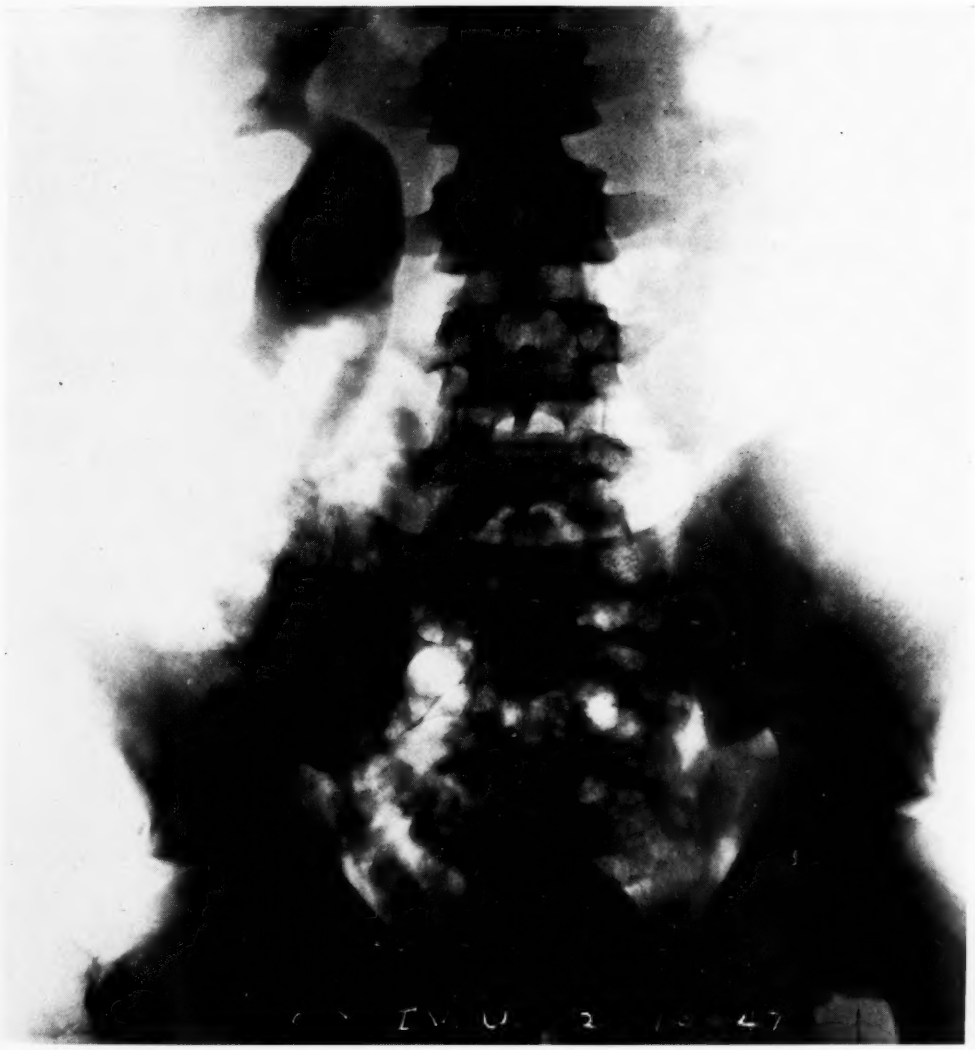


Fig. 1. *Case 2:* The 30 minute intravenous urogram showing absence of left renal function and right hydronephrosis and hydro-ureter.

bladder. It was filled with purulent fluid and communicated with an opening near the right ureteral orifice. After dissecting away the walls of the cyst a ureteral catheter was passed up the opening and a retrograde pyelogram was made. This disclosed a hydronephrotic right kidney above the normal one shown on intravenous urography (Fig. 4).

Thus it became evident that we were dealing with an enormous ureterocele arising from the ureter of the upper portion of a right double kidney and that this upper kidney was infected and hydronephrotic. The bladder was closed around a suprapubic tube.

Later the right kidney was exposed and an anomalous vessel was found crossing behind the ureter of the upper portion thus producing hydro-

nephrosis. This vessel entered the hilus of the lower portion of the kidney and had to be preserved (Fig. 5).

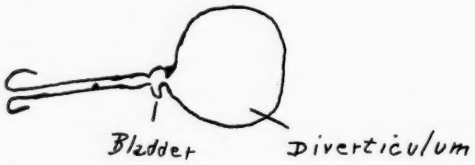


Fig. 2. *Case 2:* Diagram of relation of diverticulum to remains of true bladder.

The upper half of the kidney was removed and pathological examination showed advanced chronic atrophic pyonephritis and hydroureter with chronic ureteritis.

That the child has been free of symptoms and normal function of the remaining part of the right kidney is indicated by intravenous urography.

VESICAL NECK OBSTRUCTIONS

A brief description of the principal findings in eight cases (Nos. 4 to 11) of vesical neck obstruction follows. In all but two cases there were concomitant changes in other parts of the urinary tract such as ureteral dilatation, hydronephrosis and renal non-function. Three also had vesical diverticuli.

The usual methods of dealing with the obstructive tissue were employed in these cases—cystoscopic fulguration in *case 6;* manual dilatation of the internal orifice suprapubically in *case 10;* and dissection of the obstructing tissue suprapubically in the remainder.

Two stage operations were used when diverticuli were present. The first stage consisted of suprapubic cystotomy and dissection of the obstructing tissue; the second of the diverticulectomy. In two children a transverse incision was used for the first stage and the suprapubic tube brought out in the middle of the incision. The usual vertical incision was then resorted to for the diverticulectomy.

Case 4: D. A., 8 months old, was admitted April 4, 1947. Aside from frequent colds the child had been healthy until the previous day when it cried continuously and the mother noticed that its abdomen was hard. Physical examination was nega-

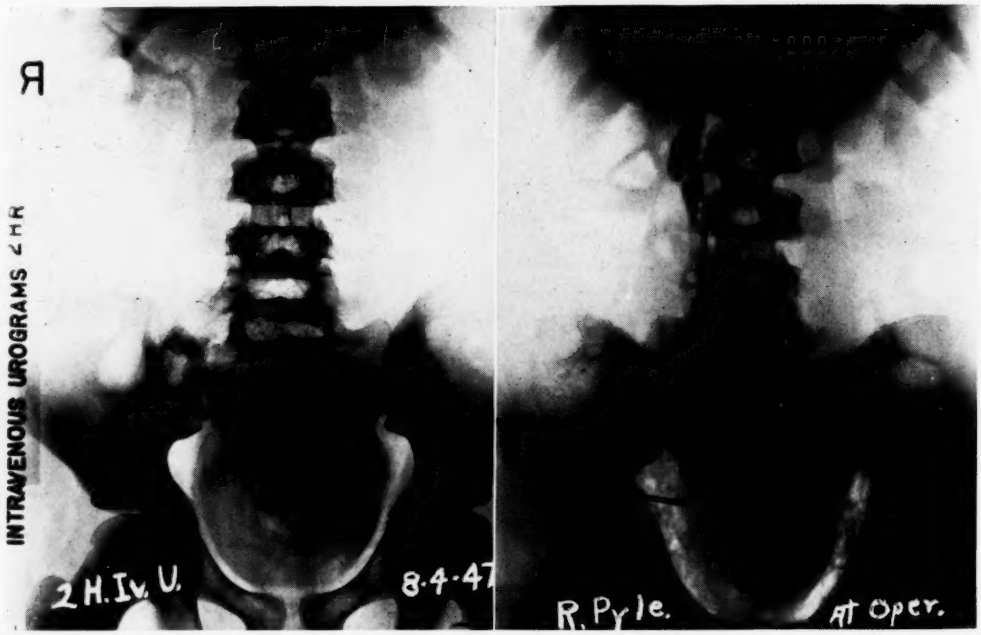


Fig. 3. Left. *Case 3:* A 2 hour intravenous urogram showing distended bladder and a single right kidney.
Fig. 4. Right. *Case 3:* A retrograde pyelogram made at operation for removal of ureterocele. This shows hydronephrotic upper portion of right kidney which was not visualized on the intravenous urograms because it did not excrete the contrast medium.

tive except for generalized abdominal rigidity. Rectally a large pelvic mass was palpable which was diagnosed a large vesical diverticulum. A catheter was passed and 350 cc. of urine was obtained. Intravenous urography showed marked left hydronephrosis and hydroureter and similar less extensive changes on the right (Fig. 6).

Obstructive tissue around the vesical neck was found at cystoscopy. This tissue was removed through a suprapubic cystotomy. The diverticulum was on the left and contained the ureteral orifice. There was an upper digitation which was readily removed and a lower pouch extending deep into the pelvis which was removed with difficulty and necessitated tying off the left ureter.

Six weeks following discharge the child was readmitted because of fever. The urine contained many pus cells and the culture showed staphylococci. Cystoscopy revealed low grade cystitis with good closure of the former diverticular orifice. Before admission sulfonamide and penicillin therapy had been tried without success. It was then decided to try local treatment and 3 cc. of silver nucleinate were instilled into the bladder daily through a catheter. This rapidly cleared the urine. Intravenous urography showed the right kidney and bladder to be normal (Fig. 7).

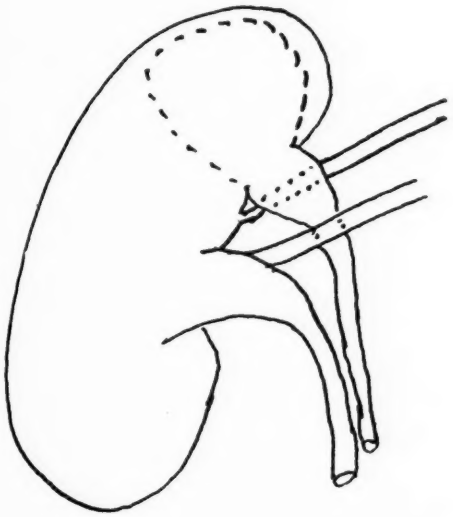


Fig. 5. *Case 3:* Diagram of vascular supply of right double kidney. An anomalous vessel supplying the good lower half crosses the ureter of the hydronephrotic upper half.

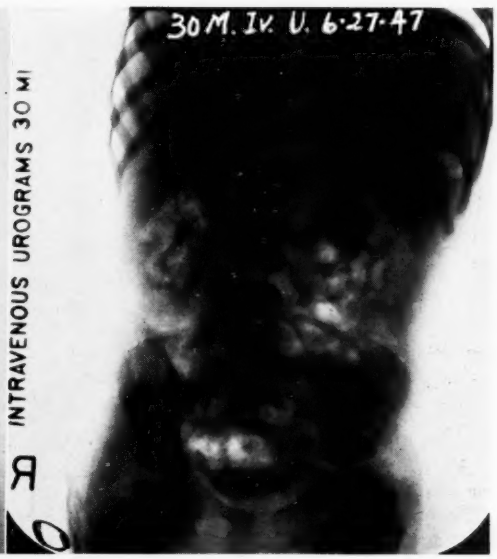


Fig. 6. Left. *Case 4:* A 2 hour intravenous urogram showing bladder distended so much as to obscure the right kidney area. The left kidney is hydronephrotic.

Fig. 7. Right. *Case 4:* The 30 minute intravenous urogram after operation showing normal bladder and right kidney.

Case 5: W. H., 20 months old, was admitted November 14, 1945. Three weeks previously the mother had noticed a bloody tinge in the urine and a week later his abdomen became hard. He urinated often and cried each time. Studies were negative except for obstructing tissue at the vesical neck found at cystoscopy, which was removed through a suprapubic cystotomy with relief of symptoms. This is one of the two cases with no pathological changes elsewhere in the urinary tract which could be attributed to the bladder neck obstruction.

Case 6: J. La P., 2 years old, was admitted June 11, 1945. He had intermittent attacks of hematuria for a year. Roentgenography showed a stone in the right kidney pelvis with absence of renal function. Cystoscopy disclosed obstructing tissue at the vesical neck which was destroyed by cystoscopic fulguration. At operation for removal of the stone from the right kidney pelvis an anomalous vessel crossing the ureter posteriorly was found and ligated. Subsequent studies did not show a return of kidney function. It is evident that in this case the renal pathology may not have been attributable to the vesical neck obstruction.

Case 7: W. M., 3 years old, was admitted December 3, 1945 because of vomiting. Physical examination was negative except for a distended bladder. The urine was normal. Blood studies showed: hemoglobin, 71 percent; erythrocytes, 4,240,000; leucocytes, 8,200; urea nitrogen, 17 mg. percent. Intravenous urography disclosed right ureteral dilatation. A median bar type of obstruction was found on cystoscopy and this was dissected through a suprapubic cystotomy.

Case 8: G. F., male, 3 years old. He was admitted May 19, 1943. The mother said that the child had never learned to control his bladder. Since birth he wets his pants about every 15 minutes during the day and also has enuresis. On physical examination the bladder was found distended almost to the umbilicus. The urine was negative. Blood findings were: hemoglobin, 82 percent; erythrocytes, 4,300,000; leucocytes, 8,200; urea nitrogen 17 mg. percent. Intravenous urography showed absence of left renal function. There was delay in excretion on the right but no evidence of hydronephrosis. At cystoscopy obstructing tissue at the vesical neck was seen.

The bladder was found to be almost an inch thick when opened at operation and the internal orifice could not be located. A *No. 10* soft rubber catheter was passed through the urethra but became obstructed in the posterior urethra. A finger was passed into the rectum to aid in manipulating the catheter into the bladder through the almost occluded internal orifice. The obstructing tissue was dissected away.

The child was completely relieved of symptoms for four years but then began to wet his pants again although there was no recurrence of the enuresis. At cystoscopy tissue resembling redundant mucous membrane was seen around the vesical neck. This was fulgurated cystoscopically with the result that a slough formed which had to be removed suprapubically. Normal urination became reestablished.

The urinary disturbance in this case resembles overflow incontinence but it is clear that hypertonicity of the bladder musculature induced by the vesical neck obstruction was the basis for the symptoms.

Case 9: S. M., male, 4 years old, was admitted September 3, 1946. He had awakened in the early morning crying with pain and had difficulty in urinating but was relieved afterward. On admission the bladder was greatly distended and the child urinated about one quart. He had a fever of 102 F. The urine was negative. Blood findings were hemoglobin, 72 percent; erythrocytes, 4,290,000; leucocytes, 3,850; urea nitrogen, 36.4 mg. percent. Rectal examination disclosed a large diverticulum. Neither kidney was visualized on intravenous urography. Cystoscopy showed vesical neck obstruction.

Following suprapubic cystotomy and dissection of the obstructing tissue at the vesical neck the fever abated and the blood urea nitrogen declined to 19.9 mg. percent. Intravenous urography showed left hydronephrosis but no function on the right. At a later date the diverticulum was removed.

Case 10: G. G., 6 years old, was admitted March 18, 1942 complaining of diurnal urinary frequency every 20 minutes but without enuresis. The urine was negative. Blood studies were: hemoglobin, 74 percent; erythrocytes, 3,730,000; leucocytes, 7,550; urea nitrogen, 11 mg. percent. Obstructing tissue at the vesical neck was seen at cystoscopy. An abdominal roentgenogram showed absence of the lower sacral and coccygeal segments of the spinal column. Intravenous urography disclosed a large bladder and left hydronephrosis and hydroureter. A suprapubic cystotomy was done and the internal orifice dilated manually. This maneuver seemed sufficient to overcome the obstruction. The child subsequently was able to retain urine for two or three hours. This is the only case of the series showing a deformity not related to the urinary tract pathology.

Case 11: M. McK., 8 years old, was admitted

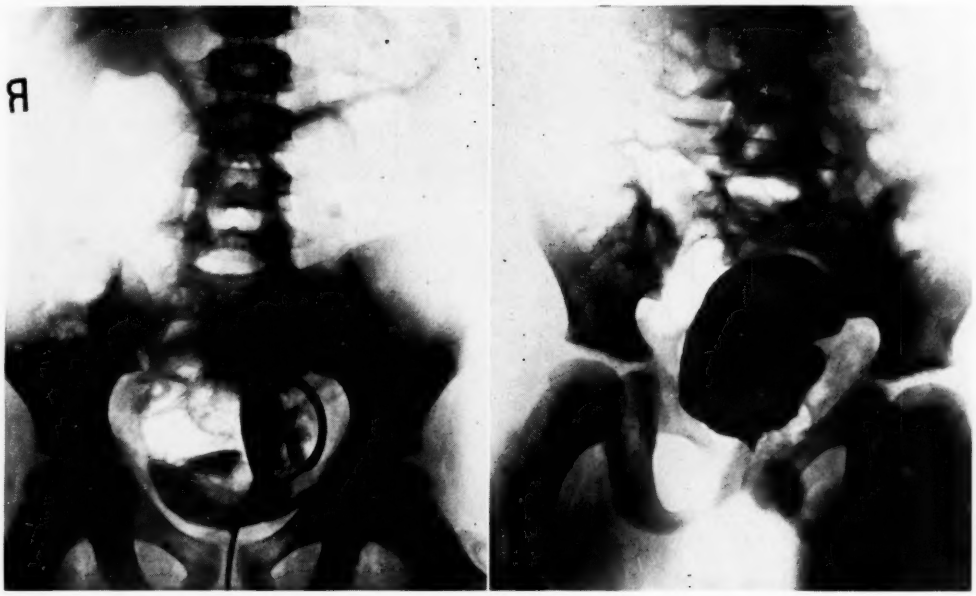


Fig. 8. Left. *Case 11:* Film showing catheter coiled up in large vesical diverticulum.
Fig. 9. Right. *Case 11:* Cystogram after diverticulectomy. A suprapubic tube is present in the bladder.

February 12, 1945 complaining of painful difficult urination for six months with some frequency and occasional nocturia. The urine contained albumin but no white blood cells. Blood examinations showed: hemoglobin, 75 percent; erythrocytes, 4,300,000; leucocytes, 8,400; urea nitrogen, 23 mg. percent. Intravenous urography disclosed normal kidney function but only a trace of excretion on the left. Obstructing tissue at the vesical neck and a diverticular orifice were seen on cystoscopy (Fig. 8).

Through a transverse incision the bladder was opened, the obstructing tissue dissected away and the bladder closed around a tube. The left kidney was explored at a later date and found to be atrophic and removed. Pathological examination showed chronic atrophic pyelonephritis. Later the bladder was opened through a vertical incision and the diverticulum removed (Fig. 9). Urination became normal.

SUMMARY

A study is presented of 11 cases of urinary bladder obstruction in children. In all but one instance the patients were boys. The vesical obstruction in the girl was an enormous ureterocele arising from one of the ureters of a double kidney. Two of the boys had urethral stricture and the other eight had vesical neck obstruction. All but two of these 10 had resultant changes in the bladder, ureters or kidneys.

Two stage operations were used in dealing with vesical neck obstruction associated with diverticuli. It was found advantageous to expose the bladder through a transverse incision for the first stage and through the usual vertical incision for the second operation.

RIASSUNTO

Descrive 11 casi di ostruzione vescicale in bambini. 10 erano maschi. Nell'unica bambina l'ostruzione vescicale era un enorme ureterocele insorto da uno degli ureteri di un rene doppio. In due maschi esisteva un restringimento uretrale, mentre negli altri otto si era stabilita un'ostruzione del collo della vescica. In tutti i casi, meno in due, la vescica, gli ureteri oul i reni rivelavano conseguenti modificazioni anatomo-patologiche.

Nelle ostruzioni del collo della vescica associata a diverticoli l'A. ha fatto ricorso ad un'operazione in due tappe. E cioe': ha dapprima esposto la vescica mediante un'incisione trasversale, mentre ha fatto appello ad un'incisione verticale nella seconda operazione.

SUMARIO

Se presenta un estudio de 11 casos de obstruccion de la vejiga urinaria en criaturas. 10 de los casos fueron ninos. La obstruccion vesical en la unica nina de esta serie se debio al ureterocelo resultante de uno de los ureteres de un rinon doble. Dos de los muchachos presentaron una estrictura uretral en cambio los ocho restantes presentaron obstruccion del cuello de la vejiga. Todos los muchachos con excepcion de dos presentaron cambios patologicos, resultante de la obstruccion, en la vejiga, ureteres y rinones.

En los casos de obstruccion del cuello con diverticulo de la vejiga la cirujia se practico en dos etapas: en la primera se hizo una exposicion de la vejiga por medio de una incision transversal, mientras que en la segunda operacion se uso la insicion vertical, que es la usual.

SOMMAIRE

Il est considéré onze cas d'obstruction de la vessie urinaire chez les enfants; tous les cas sauf un étaient des garçons. L'obstruction vésicale chez la fille était un urétérocèle énorme d'un des urétères d'un rein double. Deux garçons avaient une obstruction du col de la vessie. Chez tous les malades exceptés deux, on trouva un changement dans la vessie, dans les urétères et dans les reins. Deux des malades présentaient un rétrécissement de l'urèthre; les autres huit cas avaient une obstruction du col vésicale. On employa l'opération en deux temps dans les cas d'obstruction du col de la vessie accompagnée de diverticule. Nous avons trouvé avantageux (dans le premier temps), d'exposer la vessie par une incision transversale et dans le second temps par une incision usuelle verticale.

A New Operation for Prolapsed Uterus and Modification of Montgomery's and Simpson's Operation for Retroversion

LOUIS L. LAPI, M.D.
ROCHESTER, N. Y.

FOR YEARS I have felt that the operations for prolapsed uterus, associated with cystocele and rectocele following the menopause, have not been satisfactory. Many specialists in the field also feel that up to the present time we have not had *one* satisfactory operation, primarily in the complete prolapsed cases in women of 60 or over, whose pelvic tissues have undergone, or which are undergoing senile atrophy.

A brief review of the operations so far formulated will illustrate the evaluation of my procedure. In highlighting their faults it will be shown where they have failed to give a permanent cure. Many of the older operations relieved the condition for a short time, although a recurrence of the original prolapse, if not complete at least in part, occurred in a good many cases. Along with the above criticism, many of the older operations also gave way to abdominal complications which will be indicated.

The operations performed are under the two headings:

1. **Vaginal Route.**
   - A. Watkin's interposition with perineal repair.
   - B. Radical vaginal hysterectomy with restoration of the anterior and posterior vaginal wall.

2. **Abdominal Route.**
   - A. Extraperitoneal shortening of round ligaments.
   - B. Intraperitoneal shortening of round ligaments.
     1. Olshausen's.
     2. Gilliam's.
     3. Baldy-Webster's.
     4. Noble's method of shortening utero-sacral ligaments.
     5. Ventral fixation of the fundus of the uterus to the anterior abdominal wall.
     6. Supravaginal hysterectomy.
     7. Simpson's operation.
     8. Montgomery's operation.

The criticism to follow is not true in all cases, for each surgeon selects the operation which will best suit his patient. Perhaps some of the operations mentioned will be best suited for younger women, or where the prolapse is mild. But the operation which I have formulated is more satisfactory in extensive prolapses and for older women. There is also less surgical risk involved and the added advantage of a permanent cure or relief.

The disadvantages of the above are presented in the order given, and no attempt is made to describe any of the operative procedures because of limited time and space. Since I do not believe in the repair of a moderate prolapse until the childbearing period is past, the advantages or disadvantages for that period are not to be considered. If the condition is moderate, it can wait for the menopause. As most of these conditions require a cystocele and rectocele repair at the same time, there is no object in doing this operation during the childbearing period, except for extreme cases which can not be given palliative treatment.

The disadvantages of Interposition operation (Vaginal route) are:

1. Uterus may be too heavy or enlarged.
2. No adnexal trouble can be treated.
3. There is difficulty in shortening utero-sacral ligaments.
4. Later atrophy of uterus leaves anterior vaginal wall vulnerable.

The disadvantages of a radical vaginal hysterectomy (Vaginal route) are:

1. It leaves a weak pelvic floor in spite of cystocele and rectocele repair. The natural vaginal plug is removed.

2. Other abdominal pathology cannot be taken care of and many women who come up for this surgery have had some intra-abdominal operations which may render the procedure difficult at times.
3. The risk is greater than in the suspension operation to be described.

The disadvantages of extraperitoneal shortening of round ligaments (abdominal route) are:

1. It does not fully correct prolapse. It is adaptable to third degree retroversion with little or no prolapse.
2. Other intrapelvic pathology cannot be treated.

The present methods employed for the intraperitoneal shortening of the round ligaments will be discussed in the same order given in the introduction. The disadvantages of Olshausen's operation are:

1. It leaves three apertures in the abdomen into which knuckle of intestine or section of omentum may slip and become strangulated (Fig. 1).

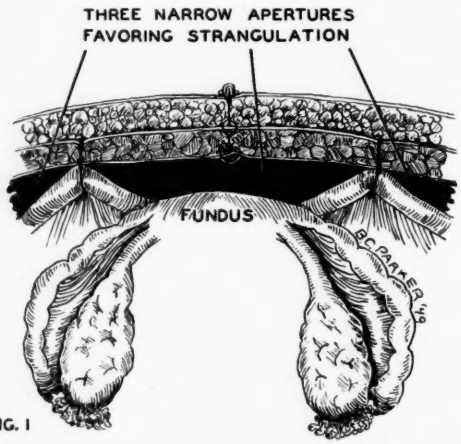


FIG. 1

2. After a period of time, due to the pull of the uterus, adhesion points stretch and recurrence of prolapse occurs. This has been seen even in simple suspension for retroversion. The contact adhesion is small and has no strength (Fig. 2).

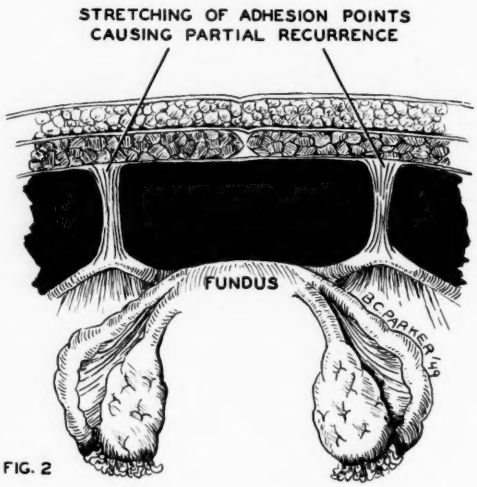


FIG. 2

In my opinion the use for Olshausen's operation is outdated and there is no excuse for its use even in simple retroversion. Gilliam's operation is to be condemned for almost the same reasons as the Olshausen, although it offers a stronger attachment to the anterior abdominal wall. Its disadvantages are:

1. It divides the lower pelvis into three apertures, with greater risk even than the Olshausen method because the apertures are more slit-like, and favor strangulation (Fig. 3).
2. Again, the points of stress are at a small surface (although larger than in Olshausen's operation) and they do not

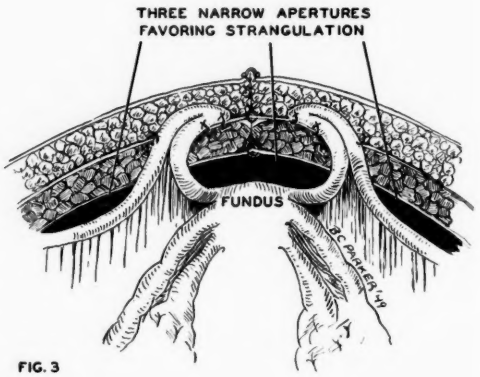


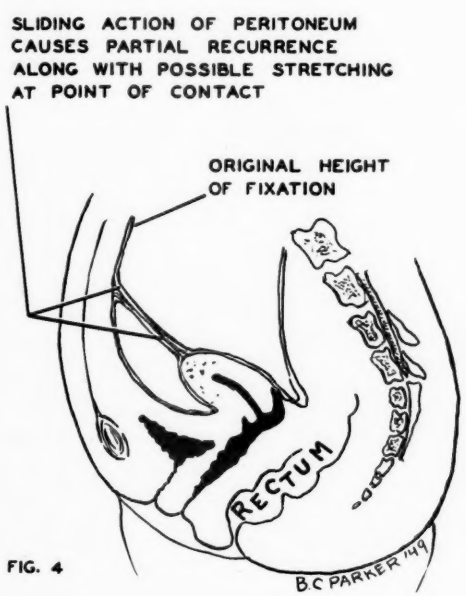
FIG. 3

take abdominal pressure as well as a large contact surface (Fig. 3).

The Baldy-Webster operation is only satisfactory in utero-displacement (retroversion) and in slight degrees of prolapse. Noble's method of shortening the uterosacral ligaments should never be done alone, but in conjunction with all other procedures in correcting prolapse. It is a valuable adjunct to other operations.

The disadvantages of ventral fixation are:

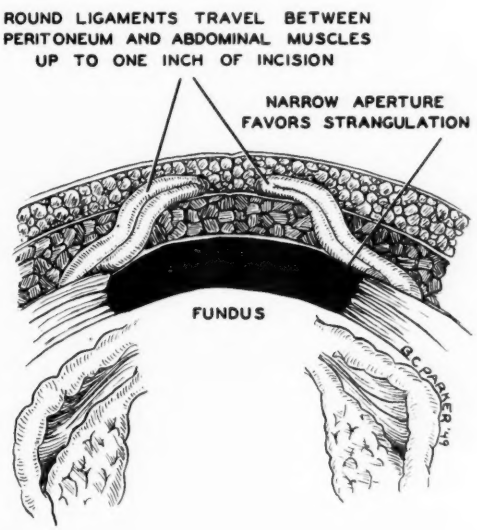
1. When attached to the peritoneum, the peritoneum glides down into the lower abdomen with pressure on the uterus and on the pelvic floor, and the uterus fails to remain in a satisfactory suspension.
2. The same adhesion band may stretch and cause a recurrence over a period of time (Fig. 4).
3. There is no live tissue beside the scar tissue to hold the suspension, as will be compared with the newly formulated operation.
4. In ventral fixation, where the fundus and body of the uterus is put between the rectus muscle and sutured to the fascia, there is left a weakness in the incision, which is subject to ventral herniation.


SLIDING ACTION OF PERITONEUM CAUSES PARTIAL RECURRENCE ALONG WITH POSSIBLE STRETCHING AT POINT OF CONTACT
ORIGINAL HEIGHT OF FIXATION
RECTUM
B.C PARKER '49
FIG. 4

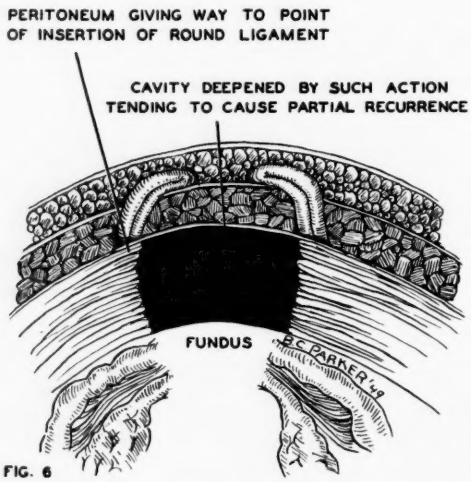
Supravaginal hysterectomy, while satisfactory, along with perineal and cystocele repair, has its disadvantages. It is radical and carries with it a greater risk especially in older people, because the time element is longer, calling for more anesthesia, and the operation is more extensive.

Because Simpson's and Montgomery's operations are so similar I shall just discuss the latter's. While this operation is preferred in younger women with moderate prolapse associated with third degree retroversion and in the childbearing period, it is unsatisfactory for severe cases of prolapse encountered in women past the menopause.

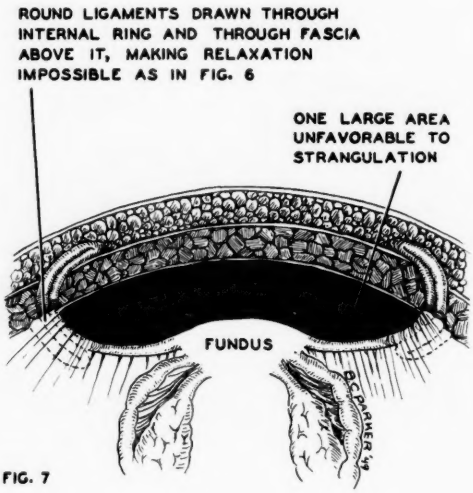
My modification of Montgomery's (Simpson's) operation dispenses with its disadvantages. Montgomery's operation leaves only one aperture which increases in depth and narrows with time. This is because the round ligaments are made to travel about one inch from the incision between the peritoneum and the rectus muscle, and then is made to perforate the rectus muscle and anterior rectus


ROUND LIGAMENTS TRAVEL BETWEEN PERITONEUM AND ABDOMINAL MUSCLES UP TO ONE INCH OF INCISION
NARROW APERTURE FAVORS STRANGULATION
FUNDUS
B.C PARKER '49
FIG. 5

sheath. As pressure and pull on the uterus is brought about, the stress tends to pull the peritoneum away from the anterior abdominal wall before its points of attachment at the anterior rectus sheath (Fig. 5, 6).


PERITONEUM GIVING WAY TO POINT OF INSERTION OF ROUND LIGAMENT
CAVITY DEEPENED BY SUCH ACTION TENDING TO CAUSE PARTIAL RECURRENCE
FUNDUS
B.C. PARKER '49
FIG. 6

A moderate recurrence of prolapse is possible. In order to get a good suspension the ligaments have to be drawn tightly, and a narrow slit aperture may be left, leading to strangulation of a knuckle of bowel (Fig 5). This operation has been modified so that the ligament, when it is drawn to the internal inguinal ring, is made to perforate through anteriorly to the external oblique fascia, and the knuckle of the round ligaments is attached to it (Fig. 7). Therefore, neither the parietal peritoneum nor the broad ligaments can be made to fan out and separate the suprapelvic cavity from the pelvic cavity. As the intra-abdominal pressure tends to push the uterus down, the points that take up the stress are lateral to the external edges of the rectus muscle and no small, narrow aperture can occur as in Figure 6. Also no give is likely to occur which will allow the uterus to prolapse. The operation, while satisfactory for moderate prolapse, is not sufficient to elevate the uterus in severe prolapse, as pulling the round ligaments taut from their attachments to the uterus and the internal ring does not sufficiently bring up the uterus to a full correction of the prolapse. It must be remembered in these cases that the cause of prolapse is atrophy or tear of other suspensory tissues. But we must rely on the uterus and round ligaments, along with cystocele and rectocele repair to effect a cure. It is obvious why this modification has all the advantages of Simpson's and Montgomery's operation without its disadvantages. I have used it exclusively on all retroversion operations in childbearing periods with no ill effects.


ROUND LIGAMENTS DRAWN THROUGH INTERNAL RING AND THROUGH FASCIA ABOVE IT, MAKING RELAXATION IMPOSSIBLE AS IN FIG. 6
ONE LARGE AREA UNFAVORABLE TO STRANGULATION
FUNDUS
B.C. PARKER '49
FIG. 7

NEW OPERATION FOR PROLAPSED UTERUS

Before deducting the advantages I shall go on with the technical procedure after the cystocele and rectocele are corrected in an approved manner. (I personally prefer in cystocele the raphe suturing of the bladder, after anchoring the bladder high over the internal os, and suturing the cervical vesicle ligaments together. Recently I have taken a fancy to Austin's technique, modifying that by adding the rapheing of the bladder.)

The cervix is cauterized or conized routinely before the cystocele and rectocele is repaired. Then the patient is put in extreme Trendelenberg position. A lower midline incision is made, dissecting on each side of the incision the subcutaneous fat for a distance of three to four

centimeters. The fascia and the peritoneum is opened and the abdominal viscera are inspected for any other surgical pathology which may be found, and are treated accordingly. The uterus is then grasped at the fundus with a tenaculum and the round ligaments are identified. They are put on a stretch by pulling the uterus up on the abdomen. The round ligament is cut at the internal inguinal ring and is dissected away from the broad ligament to its attachment at the uterus. One must not dissect too closely to the uterus for fear of destroying the blood supply to the ligament. The surface of the broad ligament, from which the round ligament has been dissected, is then carefully peritonized by invagination of its raw surfaces, or rolled around and sutured to the Fallopian tube (Fig. 8). The same process is repeated on the other side.

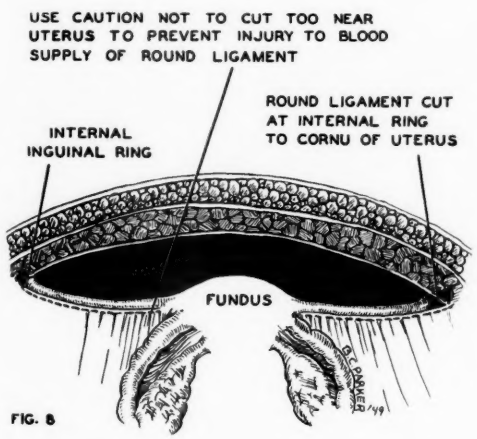

USE CAUTION NOT TO CUT TOO NEAR UTERUS TO PREVENT INJURY TO BLOOD SUPPLY OF ROUND LIGAMENT
ROUND LIGAMENT CUT AT INTERNAL RING TO CORNU OF UTERUS
INTERNAL INGUINAL RING
FUNDUS
C.C. PARKER '49

FIG. 8

When the height of the point of attachment of the fundus of the uterus to the anterior abdominal wall is determined, a heavy silk suture is brought through the fundus of the uterus from cornu to cornu. The silk is then made to penetrate the peritoneum, rectus muscle, and the anterior rectus sheath, to the subcutaneous area which was denuded previously. An assistant then holds the silk taut to keep the uterus at the desired level. The round ligaments are made to penetrate the anterior abdominal wall in the same manner as the silk just lateral to the silk. Then the peritoneum is closed. When closing the peritoneum, the fundus of the uterus is sutured to the peritoneum from round ligament to round ligament, so as to obliterate any space for a knuckle of bowel or omentum to become strangulated (Fig. 9). In the individual case it may be desirable to roughen the fundus, at its point of suture to the peritoneum, to encourage firmer adhesions.

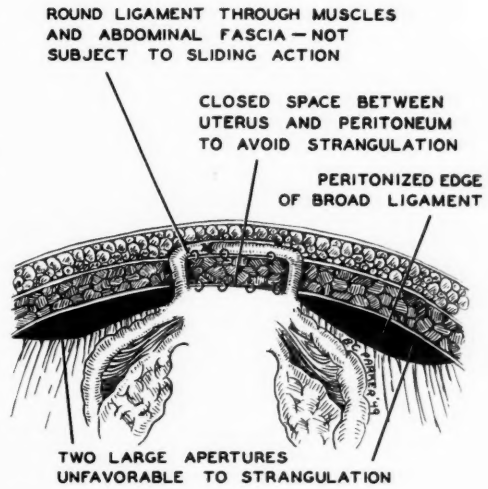

ROUND LIGAMENT THROUGH MUSCLES AND ABDOMINAL FASCIA — NOT SUBJECT TO SLIDING ACTION
CLOSED SPACE BETWEEN UTERUS AND PERITONEUM TO AVOID STRANGULATION
PERITONIZED EDGE OF BROAD LIGAMENT
TWO LARGE APERTURES UNFAVORABLE TO STRANGULATION
C.C. PARKER '49

FIG. 9

The fascia is closed either with chromic number two or fine silk. The round ligaments are drawn moderately taut so that the circulation isn't impaired, and then they are sutured with silk to the fascia of the rectus sheath. When suturing the round ligaments to the fascia, the silk should not be placed horizontal to the length of the ligaments, but with fine silk the stitching should be at the edges, and only a small amount of tissue grasped (not hindering the circulation of the ligaments) thereby causing atrophy (Fig. 10).

At this point the silk retention suture, which was put in the fundus of the uterus, can either be tied and left in for additional support until firm adhesions are formed at the fundus and peritoneum, and the round ligaments to the fascia, or it can be removed. I feel that sufficient support is given by the round ligaments

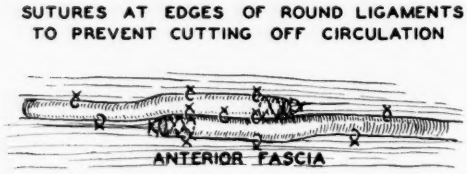


FIG. 10

alone until firm adhesions are formed. However, I see no objection to leaving in the silk as a retention suture, especially if the uterus is somewhat large and heavy. The skin is then closed according to the fancy of the surgeon.

The advantages of this operation are:

1. The round ligaments swung around to the anterior rectus sheath form live tissue suspenders which will not stretch. Therefore the suspension is permanent at that point.
2. There is no danger of cutting through the anterior fascia with the round ligaments, thereby suspending the uterus at the surgeon's original desired level.
3. It leaves two large compartments at the side of the uterus which alleviates the danger of intestinal obstruction.
4. By leaving the uterus in, the pelvic floor has less direct pressure at what would be its weakest point in a hysterectomy, as the pressure is then deviated to the sides of the pelvis.
5. The risk is less than in a hysterectomy and the normal anatomy is not molested. This is of importance in older people.
6. The amount of desired suspension of the uterus can be regulated permanently by this method.
7. In mild cystocele and rectocele with prolapse of the uterus, this simple suspension will take care of the condition without resorting to cystocele and rectocele repair. This is important in older people where the operative time is a factor.

Case Report

Surgical Approach to Strangulated Hernia in the Aged

GORDON E. PERRIGARD, M.D., C.M.
MONTREAL, P. Q.

STRANGULATED small bowel hernias, especially the femoral type in elderly patients, may be complicated by perforation of the intestine brought on by the efforts of coughing or vomiting, or by necrosis and infection from reduction en masse and wound infection. The following two cases are illustrative:

Case 1: Female, white, 72 years of age. On admission she had abdominal distension, pronounced cardiac arrhythmia, jaundice and lobar pneumonia. The patient had experienced a pain in her right groin about three days prior to admission, and had been coughing and vomiting since then. Abdominal pain finally became so severe she sought surgical attention. In the right groin there was a non-reducible femoral hernia.

On operation the femoral hernia containing omentum was reduced and repaired. A faint odour of feces was noticed and accordingly the abdomen was explored. The intestines, covered with flecks of bowel contents, were floating on pools of pale brownish fecal smelling fluid. A necrotic section of the small bowel was found with a perforation about two and a half inches long, with omental adhesions fixed to the side of the bowel. Part of the omentum showed a torn necrotic area where it had been adherent to the region of the femoral hernia (Fig. 1).

Apparently what had occurred was that the loop of bowel down in the femoral hernia sac had been torn loose by the strain of coughing and vomiting thus causing the perforation. A bowel resection was carried out and the abdomen closed.

Case 2: This case first came to my attention at postmortem examination. She was 70 years of age, with a preoperative history of sudden onset of abdominal pain with nausea and vomiting and the reappearance of a small mass in the left groin. She was operated for inguinal hernia by the inguinal route.

She survived ten postoperative days with persisting vomiting and abdominal distress. Postmortem examination revealed wound disruption with a collection of sanguinous serum in a necrotic cavity about two inches long extending from the lateral edge of the wound down medially to the femoral canal, through which entered a strangulated, perforated, necrotic knuckle of small bowel.

In the aged, any hernia which has the signs or symptoms of strangulation, should be surgically repaired through the intra-abdominal route, so that the intestines may be examined thoroughly for any perforations, and for any possible reduction of a hernia en masse, or the presence of multiple hernias may not be missed.

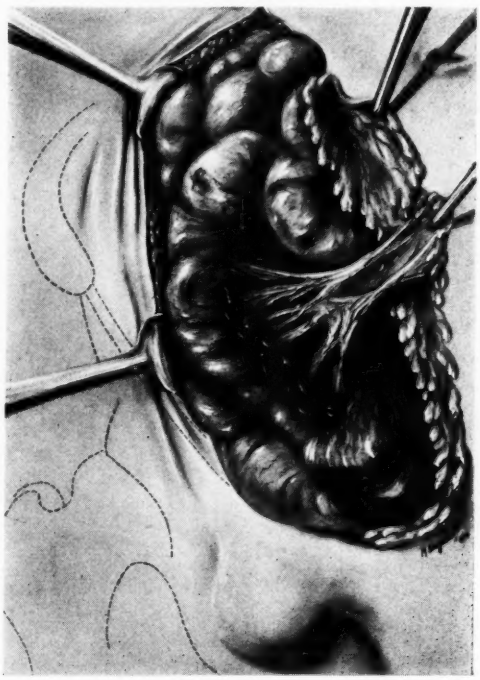


Fig. 1. Case of femoral hernia, sustaining perforation of small bowel, following spontaneous reduction from efforts of coughing and vomiting.

RIASSUNTO

Descrive due casi di ernia strozzata del tenue, con perforazione dell'intestino. In base all'osservazione di questi casi, l'A. ritiene che

—specialmente nei vecchi—ogni ernia sospetta di strozzamento debba essere operata per via intraaddominale onde ispezionare a fondo le condizioni dell'intestino.

SUMARIO

Se han presentado dos casos de hernia estrangulada del intestino delgado con perforacion intestinal.

Se sujiere, particularmente en los viejos, que toda hernia que presente evidencias de estrangulacion sea reparada intra-abdominalmente por cuanto solo asi se puede hacer una inspeccion completa de la viscera para determinar la presencia de complicaciones.

SOMMAIRE

L'auteur présente deux cas de hernie étranglée de l'intestin grèle, compliquée de perforation de l'intestin. Il suggère que chez le vieillard, toute hernie présentant des symptomes d'étranglement, soit reparée par la voie intra-abdominale. Cette voie permet l'examen au cours de l'opération des viscères abdominaux.

Sección en Español

Enclavijamiento Intramedular Del Esqueleto

ALFREDO GONZALEZ GARCIA, M.D., F.I.C.S.
VEDADO, HABANA

SUMMARY

1. The intramedullary nail is in our opinion the ideal treatment in fractures of the shaft of long bones.

2. That it is possible thru proficiency in the technic to carry this procedure by the closed method, but if necessary an opened reduction may be performed without fear of serious complications.

3. In order to obtain good results by this procedure it is essential that the surgeon become very familiar with its technic.

4. That this procedure in our experience up to the present has been innocuous.

EL enclavijamiento o fijación intramedular del esqueleto en las fracturas diafisiarias de los huesos largos es un procedimiento que nace en el año 1940 descrito por Küntscher de Kiel. El método consiste en introducir en el conducto medular una varilla metálica, y abre a nuestro juicio una nueva era en el tratamiento de estas fracturas.

No nos pasan desapercibidos los problemas de órden biológico que esta técnica representa. Entre estos podemos citar: la destrucción de la médula ósea, la embolia grasosa, el peligro de infección, la tolerancia de la varilla y la consolidación.

Destrucción de La Medula Ósea: No cabe duda que uno de los problemas que se plantea es la destrucción de la médula ósea que como sabemos sucede en ésta técnica, sin embargo, no hemos observado consecuencia alguna por las pequeñas porciones de médula que arrastra la varilla durante su paso por el canal medular, por lo tanto consideramos que no tiene importancia esta destrucción, y menos si recordamos que se han descrito técnicas anteriormente en que se extraía la médula ósea de los huesos largos para el tratamiento de la anemia perniciosa sin ninguna complicación.

Embolia Grasosa: La embolia grasosa que es complicación grave no la hemos observado. Gómez Navarro citado por el profesor Martín Lagos señala un aumento de la lipasa en la sangre en los días sucesivos a las fracturas.

La realidad es que no hemos visto la citada embolia en ningún trabajo. Los que hablan de esta complicación la señalan como muy rara, y además todos sabemos que es una complicación de cualquier técnica quirúrgica.

Peligro de Infección: La infección intramedular que nunca hemos observado es otro peligro señalado en los problemas biológicos de esta técnica, que podría hacer una mielitis, complicación de seria gravedad que todos conocemos.

No obstante, es de suponer que en los casos cerrados podría aparecer solamente por el arrastre de gérmenes del exterior, desde el punto de la perforación al foco de fractura y en los casos abiertos por el mecanismo de toda infección postoperatoria.

Tolerancia de La Varilla: La varilla intramedular es perfectamente tolerable y no hay que tener la preocupación que antigüamente se tenía con la síntesis interna pues lo mismo que a medida que las técnicas de las osteosíntesis han avanzado hasta que se han suprimido en la casi totalidad las intolerancias de las mismas, el enclavijamiento intramedular no ha producido intolerancia en ninguno de nuestros casos.

La reacción ósea del enclavijamiento se manifiesta por un callo perióstico abundante y si la varilla no es extraída a tiempo, este callo puede hacerse exhuberante lo cual hemos comprobado en dos de nuestros casos en que la extracción se hizo demasiado tarde.

Consolidación: La consolidación, con sorpresa nuestra, es rapidísima y más en algunos huesos que en otros, dependiendo del hueso y lugar de la diáfisis en donde se encuentra situada la fractura.

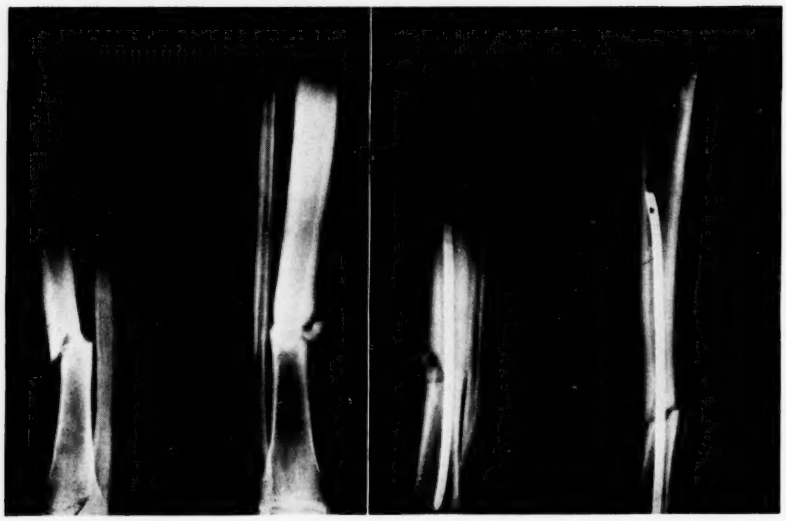


Fig. 1A Fig. 1B

Debenos citar como ejemplo de esta aseveración que en el húmero hemos observado callo perióstico bastante sólido que comienza a las dos semanas y obtenido una consolidación total en seis semanas.

En un caso de fractura del tercio medio con el inferior de la tibia hemos encontrado un retardo de la consolidación y lo atribuímos a la nutrición más pobre del sitio de la fractura puesto que cuando las fracturas han sucedido en el tercio medio y en el medio con el superior la consolidación se ha desarrollado aceleradamente.

Es posible que la inmovilización del foco de fractura en condiciones más anatómicas como sucede en la mayoría de los casos en que se utiliza esta técnica, favorezca la rápida formación del callo ayudado por el estímulo poderoso de la movilización inmediata y de la deambulación precoz.

VENTAJAS DEL PROCEDIMIENTO

Las ventajas del enclavijamiento intramedular del esqueleto son:

Primero: Movimiento de las articulaciones vecinas, lo cual evita las rigideces articulares que tanto trabajo dan posteriormente en personas jóvenes y mucho más en personas de edad avanzada.

Segundo: Evita las atrofias musculares por la movilización inmediata después de la intervención quirúrgica.

Tercero: Este procedimiento permite que los pacientes puedan deambular a las pocas horas de ser intervenidos cuando se utiliza elmétodo cerrado, y cuando no, pueden deambular a los pocos días tan pronto han sido extraídos los puntos de la herida operatoria del foco de fractura.

Cuarto: El tratamiento se hace más económico porque los pacientes pueden abandonar a los pocos días el hospital o clínica donde están asilados y concurrir periódicamente a las consultas externas para su observación reglada hasta la extracción de la varilla.

Antes de señalar algunos de los casos de nuestra estadística, vamos a aconsejar algunos detalles de técnica fundamentales, y tomaremos como ejemplo, el fémur, la tibia y el húmero.

Femur: Para el enclavijamiento intramedular de la diáfisis femoral es necesario colocar al paciente lateralmente flexionando el miembro sano que se encuentra en contacto con la mesa y poniendo una o dos almohadas para que la pierna enferma descanse cómodamente a la vez que se coloca flexionada sobre el tronco.

Utilizamos la mesa ortopédica o la tracción

manual según cada caso y después de comprobar radiológica o fluoroscópicamente que la reducción es perfecta lo cual a veces exige repetidas maniobras por el exceso de masas musculares que envuelven los fragmentos, practicamos una incisión por encima del vértice del trocanter mayor con el objeto de liberar al hueso. Hemos utilizado un perforador eléctrico para abrir el orificio por donde vamos a introducir la varilla metálica.

Esta introducción se realiza a golpe de martillo y después se sutura la piel. Somos partidarios de la incisión relativamente amplia, cuatro a cinco cms.

Fractura de La Tibia: Después de anestesiado el caso y reducida la fractura con el aparato de tracción de Bohler o simplemente haciendo tracción manual del miembro que en

Fig. 2A

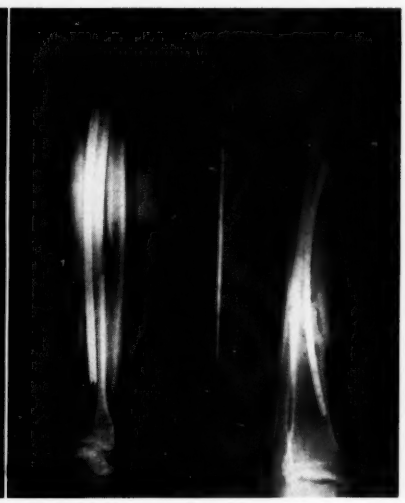


Fig. 2B

muchas ocasiones es suficiente, se comprueba la reducción por control fluoroscópico o radiográfico y obtenida la misma, se practica una incisión en la cara interna de la tibia a nivel de la tuberosidad anterior.

En lugar de usar el perforador de Künscher hemos hecho la perforación a cincel y martillo levantando un pequeño fragmento de la cortical de un cm. cuadrado, por donde introducimos la varilla en el canal medular. Hemos ordenado la fabricación de las mismas por el molde del canal medular de varias tibias de cadáveres de distintos tamaños.

Elegimos de nuestras varillas, la de diámetro y longitud necesaria según cada caso, en algunos casos hemos puesto dos varillas convenientemente fabricadas y que adaptadas a la forma del canal de la tibia nos ha dado el resultado apetecido.

Introducimos la varilla a golpe de martillo hasta que sobresalga un centímetro por encima del orifico de entrada para su extracción posterior.

Uno o dos puntos de la piel completan la intervención y nunca hemos usado aparato de yeso inmovilizador.

Fractura del Humero: Generalmente utilizamos la anestesia de plexo braquial. Colocamos el enfermo en decúbito prono con el brazo en abducción y el antebrazo colgando de la mesa. Practicamos la incisión por encima de la foseta olecraneana para evitar la articulación del codo y por ser la vía de acceso menos peligrosa en la extremidad distal de la diáfisis humeral. Hemos desechado el abordaje por el fragmento proximal por creer que la técnica es más difícl y peligrosa.

Practicamos un orificio para introducir la

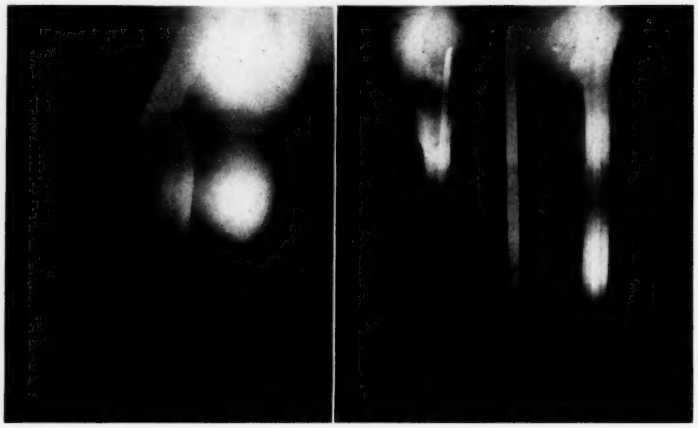


Fig. 3A Fig. 3B

varilla en el canal medular, y continuamos nuestra técnica como en casos anteriores.

Debemos señalar que cuando la reducción no ha podido ser perfecta es necesario practicar una incisión en el foco de fractura para proceder al afrontamiento y poder pasar la varilla. No hemos tenido ninguna consecuencia en los caos en que hemos practicado la técnica a cielo abierto los cuales han evolucionado igual que los cerrados.

Caso 1: E. A., Natural de Güira de Melena, masculino, soltero, 28 años, raza blanca, campesino. Fractura del tercio medio con inf. de la tibia derecha con ligero desplazamiento y angulación. Reducción por enclavijamiento intramedular. Deambulación a los diez días. Retardo de la consolidación. Perfecto funcionamiento a los 60 días y curación total a los 150 días (Fig. 1A-1B).

Caso 2: D. M., Natural de Zulueta, masculino, soltero, 42 años, raza blanca, jornalero. Fractura

Fig. 4A Fig. 4B

Fig. 5A

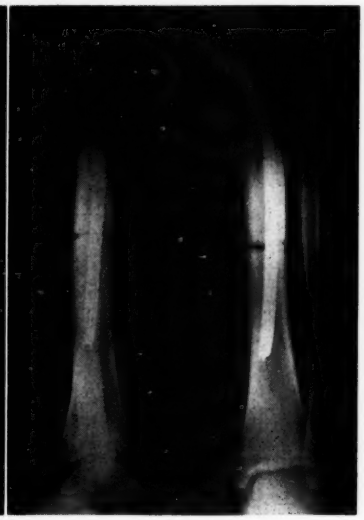


Fig. 5B

por flexión de tercio medio de la tibia derecha y tercio inferior del peroné del mismo lado con ligero desplazamiento lateral, reducida por enclavijamiento intramedular. Deambulación a los siete días. Resultado excelente con perfecto funcionamiento a los 90 días (Fig. 2A-2B).

Caso 3: A. M., Natural de Agúada de Pasajeros, masculino, soltero, 29 años, raza blanca, campesino. Fractura del tercio medio con el superior del fémur izquierdo con desplazamiento y angulación. Reducción por enclavijamiento intramedular. Deambulación a los 10 días. Se traslada a su domicilio. Perfecto funcionamiento a los 85 días (Fig. 3A-3B).

Caso 4: R. M., Natural de España, masculino, soltero, 58 años, raza blanca, campesino. Fractura del tercio inferior del húmero izquierdo con gran desplazamiento. Reducción por enclavijamiento intramedular. Comenzó la consolidación a las dos semanas y tenía buen callo a los cuarenta días. A los ciento cincuenta días recobra la movilidad del codo y se obtiene buen resultado (Fig. 4A-4B).

Caso 5: H. S., Natural de Güira de Melena,

Fig. 6A

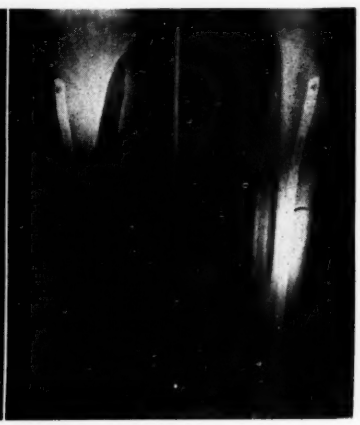


Fig. 6B

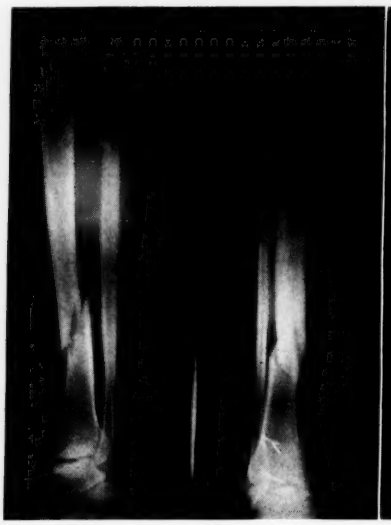


Fig. 7A

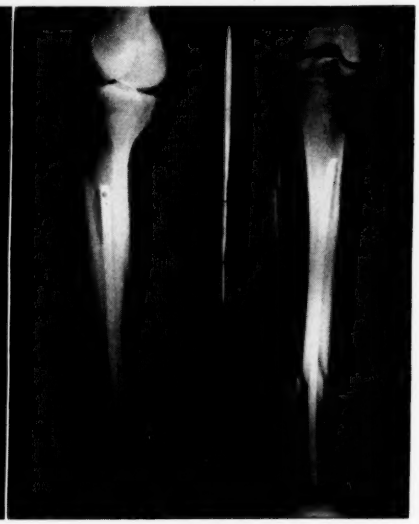


Fig. 7B

masculino, soltero, 19 años, raza negra, escolar. Fractura transversal del tercio medio de la tibia izquierda y de la unión de tercio medio con el inferior del peroné del mismo lado con desplazamiento y angulación. Fué reducida por enclavijamiento intramedular. Deambulación a los tres

Fig 8A

Fig. 8B

días. Consolidación rapidísima. Perfecto funcionamiento a los 60 días (Fig. 5A-5B).

Caso 6: R. V., Natural de Ciego de Avila, masculino, soltero, 38 años, raza blanca, campesino. Fractura del tercio inferior de la tibia derecha y tercio superior del peroné del mismo lado. Reducción con enclavijamiento intramedular. Deambulación a los 10 días y excelente resultado a los 70 días (Fig. 6A-6B).

Caso 7: J. B., Natural de Zulueta, masculino, casado, 28 años, raza blanca, carretero. Fractura por torsión de tercio medio con tercio inferior de la tibia izquierda y tercio superior del peroné del mismo lado con ligero desplazamiento lateral. Reducción por enclavijamiento intramedular. Deambulación a los 20 días. Se trasladó a su domicilio. Continúa deambulando perfectamente y en vías de curación (Fig. 7A-7B).

Caso 8: J. P., Natural de Banes, masculino, casado, 52 años, raza blanca, jornalero. Fractura subtrocanterea del fémur con desplazamiento. Fué reducida por enclavijamiento intramedular. Comienza la consolidación a las tres semanas. Consolidación a los 60 días (Fig. 8A-8B).

ESTADISTICA

(Desde Junio de 1946 a Mayo de 1948)

RESULTADO

HUESO	NO.	BUENOS	MEDIANOS	
Radio	2	1	1	Callo exhuberante
Cúbito	2	1	1	Callo exhuberante
Húmero	2	2		
Tibia	7	6	1	Retardo consolidación
Fémur	3	3		
TOTAL	16	13	2	TOTAL 16

CONCLUSIONES

Primero: Que el enclavijamiento intramedular es a nuestro juicio el tratamiento ideal en las fracturas diafisiarias de los huesos largos.

Segundo: Que es posible adiestrándose bien en la técnica hacer los casos cerrados, pero si es necesario se puede practicar la reducción a cielo abierto. Esto no produce consecuencias posteriores.

Tercero: Que es necesario imponerse bien de la técnica para obtener buenos resultados.

Cuarto: Que la intervención en nuestra experiencia hasta el momento actual ha sido inocua.

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Editorial

Comments on Meigs' Syndrome*

MEIGS' syndrome as originally described, deals with the association of ascites, hydrothorax and ovarian fibroma. Since then thoracic and abdominal effusions have been found and reported with other forms of pelvic tumor occurring in the female, including multilocular cystadenoma, thecoma, Brenner cell tumor, granulosa cell tumor of the ovary, pseudomucinous multilocular cystadenoma, complex teratoma of the ovary, ovarian and uterine fibromyomata, and papillary cystadenocarcinoma. In a recent review of this condition, Calmenson, Dockerty and Bianco have traced the history of this syndrome from the first case recorded by Cullingsworth in 1879 in which the effusions were present with bilateral fibromata of the ovaries. Nevertheless, Meigs' description of this form of pathology in 1937 emphasized this association, and he deserves the credit of dispelling the discouraging assumption that all cases of pelvic tumor associated with chest and abdominal effusions were necessarily malignant.

Sciorsci's report deals with pelvic tumors associated with peritoneal effusions alone and he suspects that the mechanism of production of the ascites is the same as when the pleural cavity is also involved. He rightly excludes from the discussion cases with concomitant inflammatory disease, or with torsions of the pedicle; and, by the same token, malignancies should also be excluded. The similarity to Meigs' cases is emphasized by the non-recurrence of the fluid after removal of the tumor. The contrast is in the presence of the hydrothorax. There seems to be no definite correlation between the amount of fluid and the duration or character of the pelvic tumor. The causal relation between tumor and effusion is definite; also the precedence of the ascites before the hydrothorax, inasmuch as the reverse of this has not apparently been observed. The chest effusion, as experimentally substantiated, accumulates, probably secondarily, by one-way pathways through the diaphragm.

One case history presented in Sciorsci's report deals with a white Italian girl, 21 years old, who had removed, two years previous to her examination in 1941, a papillary cystadenoma of the right ovary with inflammatory and degenerative changes presumably due to a long pedicle twisted two and a half times. This cyst occupied the greater part of the abdominal cavity and there were 800 cc. of serosanguinous free fluid in the peritoneum. The uterus contained a small intramural fibromyoma which was removed. The contralateral ovary appeared perfectly normal. There were no signs of fluid in the pleurae and at the time of the second operation obvious signs of fluid in the right pleural sac were presented. About 10 days before operation 680 cc. of straw-colored transudate were removed by thoracentesis, in the belief that she had a pleurisy with effusion.

The possibility of a Meigs' syndrome occurred to Sciorsci only at surgery when 1600 cc. of straw-colored transudate were found in the peritoneal cavity while a large cyst of the left ovary was removed. The cyst, 19 cm. in diameter, was reported as a pseudomucinous papillary cyst-adenocarcinoma grade 1 of the left ovary. There was no twist of the pedicle.

Sciorsci rightly suggests the value of nutritional chemical studies in patients with Meigs' syndrome and the relation of the general studies to the nutritional changes in the tumors themselves. With present day views of protein deficiencies and their consequent disturbance of fluid balance, this is a timely suggestion.

Such fluid accumulations have no definite diagnostic or prognostic significance. Of paramount importance, is precise anatomical diagnosis of the various tumors, especially of the ovarian ones, so that there might be no needless sacrifice of ovarian tissue when no malignancy is present.

* Dr. Abraham O. Wilensky died February 4, 1949, in New York City.

Special Feature

The World Medical Association*

LOUIS H. BAUER, M.D., F.A.C.P.
BOSTON, MASS.

The World Medical Association came into being in Paris, September, 1947. The first *Bulletin* of the Association describes its origin as follows.

"In the darkest days of the Second World War, when Britain was the base for allied operations against the enemy in Europe, North Africa, and the Middle East, and when Free French, Norwegians, Dutch, Czechs and Poles mingled on British soil with Australians, Canadians, New Zealanders, South Africans, Britons and Americans, doctors of many different nationalities found their way to the B.M.A. House in London, the home of the British Medical Association. Though soldiers, sailors and airmen for the nonce, most of them had left practices and appointments behind, and their conversations with each other and with the medical staff of the British Medical Association showed to what a great extent practitioners from all parts of the world share common interests, common problems and common ideas.

"When the war appeared to be drawing to a close, the officers and secretariat of the British Medical Association considered how these valuable friendships could be maintained and utilized in more normal times, and in the Spring of 1945, they decided to call an informal conference of doctors of different nationalities who were in London at the time, in order to obtain their views on a proposal to create some permanent organization or liaison among the medical profession in all countries. The conference was held at B.M.A. House in London, July, 1945."

Prior to the war, there had been another international medical organization known as the "Association Professionnelle Internationale des Médecins." This organization was largely composed of European countries. This organization, naturally, became inactive during the war. Its officials were invited to join with the new group.

A meeting was held in London, September, 1946. It was then decided to abolish the old organization and create a new one. A committee was appointed to find the ways and means. In November, 1946, another meeting was held and a preliminary draft of a Constitution and By-Laws was made. The American Medical Association was represented at the earlier meetings only by observers. After the November, 1946 meeting, this organization decided to take part. Dr. Elmer L. Henderson, chairman of the board of trustees, American Medical Association, and myself were authorized to attend the next meeting of the Organizing Committee.

This meeting was held in London, April, 1947. It was attended by representatives from Great Britain, Sweden, Belgium, France, Spain, Czechoslovakia, Switzerland, Canada and the United States. A final draft of the Constitution and By-Laws was prepared and arrangements completed for a plenary session in Paris, September, 1947.

This session was held at the headquarters of the Confederation des Syndicats Médicaux Français. It was attended by representatives of 45 nations, many of which were represented only by observers. The General Assembly adopted the Constitution and By-Laws and outlined a program for the ensuing year. To quote again from the *Bulletin*,

"There had come into existence a forum for the exchange of views and the discussion of common professional problems and a voluntary central authority which would be competent to express world professional opinion to official international bodies."

The objects of the World Medical Association as defined in its Constitution are:

1. To promote closer ties among the national medical organizations and among the doctors of the world by personal contact and all other means available.
2. To maintain the honour and protect the interests of the medical profession.
3. To study and report on the professional problems which confront the medical profession in the different countries.
4. To organize an exchange of information on matters of interest to the medical profession.
5. To establish relations with, and to present the views of the Medical profession to, the World Health Organization, U.N.E.S.C.O. and other appropriate bodies.

* Read before the Thirteenth National Assembly, United States Chapter, International College of Surgeons, St. Louis, Nov. 15-20, 1948.

6. To assist all peoples of the world to attain the highest possible level of health.
7. To promote world peace.

The unit of membership in the Association is the national medical association which is most representative of the member country. Each member association is entitled to send two delegates and as many observers as it desires.

After the First General Assembly, 26 nations fulfilled all the requirements of membership. One of these had to withdraw because the government of its country abolished the Medical Association.

At the Second General Assembly, 14 more nations were elected to membership so that at the present time there are 39 nations represented through their national medical association. Others have applied and it is confidently anticipated that within the next two years there will be sixty nations represented.

The countries which are now members are:

Australia	Hungary
Austria	Iceland
Belgium	India
Bulgaria	Italy
Canada	Luxemburg
China	New Zealand
Colombia	Norway
Chile	Pakistan
Cuba	Palestine-Arab
Denmark	Palestine-Jewish
Dominican Republic	Peru
Ecuador	Philippines
Eire	Poland
Finland	Portugal
France	South Africa
Great Britain	Spain
Greece	Sweden
Guatemala	Switzerland
Holland	Turkey

United States

The president of the association is from France; the president-elect from Great Britain; the treasurer from Switzerland; the secretary-general from the United States; the chairman of the council from Canada; the vice-chairman from Sweden and the other members of the council from Belgium, Cuba, France, Great Britain, China, India, Spain and the United States.

Not all nations have a truly representative medical association, which is why some countries are not represented. It is fair to state in this connection that where there is no strong national medical association, health, medical care and medical education are on a distinctively lower level. One of our aims is to foster the development of national medical associations where there are none and to strengthen others, so that they in turn can become active agents in improving medical standards in their countries.

Many may wonder how a medical association can aid in fostering world peace. I believe it can do so very definitely. Doctors have a common meeting ground. They have like aims and ideals. Certainly, if *they* cannot get together, no one can. In April, 1948, the council of the World Medical Association met in New York. Its members saw American medicine and medical education in New York, Chicago and at the Mayo Clinic. It is my firm belief that the members of this group were thoroughly impressed by American medicine and American hospitality. I believe they went home, all as good-will ambassadors to the United States. Much can be accomplished by further meetings and the extension of that good-will to their friends and associates not in the medical profession.

Many momentous decisions were made at the Second General Assembly, held at Geneva, Switzerland, September, 1948.

A report on German War Crimes was adopted. This document prepared by the United Nations gave in detail the crimes committed by German physicians in hospitals and concentration camps. These crimes were classified by the United Nations War Crimes Commission as follows:

"Experiments without consent on human subjects authorized by high authorities on the pretext of scientific research in the interests of war.

"Experiments without consent conducted by medical officials in concentration camps on their own initiative in order to gain experience.

"Deliberate selection of prisoners in camps for subsequent killing, by wilful medical neglect or by lethal injections.

"Deliberate killing of infirm or feeble-minded patients and of children in hospitals and asylums.

"The evidence indicates that the so-called experiments include:

"The effect of vacuum and pressure chambers.

"Sterilization — chemical, operative and radiological, with controls by artificial insemination.

"Blood transfusion.

"Cold water immersion, with periodic tests and different methods of resuscitation.

"Liver puncture.

"Deliberate septic infection.

"Excision of parts of the body.

"Experimental operative surgery—non-indicated operations—for instructional purposes.

"Exposure to gas and other chemicals for varying periods and results checked by autopsy.

"Methods of 'mercy killing,' gas, benzene injections, cremation of semi-moribund individuals, etc."

The German physicians not involved in these crimes were invited to disavow the actions of their criminal associates, to expel them from their medical societies and to take steps to prevent a recurrence. After much discussion the following vow was adopted by the General Assembly:

At the time of being admitted as Member of the Medical Profession

I solemnly pledge myself to consecrate my life to the service of humanity.

I will give to my teachers the respect and gratitude which is their due;

I will practice my profession with conscience and dignity;

The health of my patient will be my first consideration;

I will respect the secrets which are confided in me;

I will maintain by all the means in my power, the honor and the noble traditions of the medical profession;

My colleagues will be my brothers;

I will not permit considerations of religion, nationality, race, party politics or social standing to intervene between my duty and my patients;

I will maintain the utmost respect for human life, from the time of conception; even under threat, I will not use my medical knowledge contrary to the laws of humanity.

I make these promises solemnly, freely and upon my honor.

It was recommended that the above or a similar vow be adopted by the licensing authorities and the medical associations of the world as a prerequisite to licensure or membership.

Consideration was given to the preparation of an international code of ethics. A committee was appointed to draft such a code, and the committee was given directions to divide the code into four chapters covering:

1. Obligations of physicians in general.
2. Duties of physicians to patients.
3. Responsibilities of the physician to the public, community and state.
4. Duties of physicians to each other.

It was also recommended that there be included provisions relative to the behavior of physicians visiting foreign countries.

A report entitled, "The Status of the Medical Profession in 23 Countries" was adopted. This report covers medical man-power, registration of physicians, professional organization, the environment of medical practice, the trend of medical practice and the status of the doctor in all these countries.

A preliminary report, "The Advertisement and Sale of Secret Remedies and Appliances" was approved and further study was authorized. So far 22 countries have sent in replies on this subject. The report shows the presence or absence of control and the character of that control when authorized.

Another preliminary report, "Unqualified Medical Practice" was approved and further study directed. Fourteen countries so far have submitted reports. It is a matter of regret that of the 14 countries replying the United States is one of two countries where there are schools or programs of training for unqualified practitioners. A complete report will be issued later.

A comprehensive study on "Medical Education" is in the process of compilation. It is hoped that this report will be ready in the Spring of 1949.

Postgraduate education and the training of

specialists in the different countries is on the agenda for the next year.

A thorough discussion on social security and health insurance took the greater part of the day and a half of the proceedings of the General Assembly. The report finally adopted included a discussion of social security as it exists in various countries; the appointment of a permanent committee on social security to study and keep all medical associations informed of changes in the situation as they develop throughout the world, and the adoption of the following 12 principles whenever medical care is provided as a part of social security:

1. Freedom of choice of physician by the patient. Liberty of physician to choose patient except in cases of urgency or humanitarianism.
2. No intervention of third party between physician and patient.
3. Where medical service is to be submitted to control, this control should be exercised by physicians.
4. Freedom of choice of hospital by patient.
5. Freedom of the physician to choose the location and type of his practice.
6. No restriction of medication or mode of treatment by physician except in case of abuse.
7. Appropriate representation of medical profession in every official body dealing with medical care.
8. It is not in the public interest that physicians should be full-time salaried servants of the government or social security bodies.
9. Remuneration of medical services ought not to depend directly on the financial condition of the insurance organization.
10. Any social security or insurance plan must be open to the participation of any licensed physician, and no physician should be compelled to participate if he does not wish to do so.
11. Compulsory health insurance plans should cover only those persons who are unable to make their own arrangements for medical care.
12. There shall be no exploitation of the physician, the physician's services or the public by any person or organization.

That the 29 countries represented at the meeting could adopt such resolutions is perhaps not to be wondered at in itself, but that they could do so unanimously is little short of marvelous. There were, of course, many arguments and much discussion, most of which was due to language difficulties. The World Medical Association deals in three languages, English, French and Spanish. It is difficult to translate a document from one language into another and have it mean the same thing. Often entirely different wording must be used in order to convey the same meaning. However, after all the language difficulties were ironed out, the resolutions as finally drafted were adopted without a dissenting vote. This is one example of how the doctors of the world think alike.

In adopting the resolution that compulsory health insurance, if adopted, apply only to those persons unable to provide medical care for themselves, one delegate said, "I would like to support the addition of this clause. The association that I represent would regard the inclusion of such a clause as a fundamental necessity, and for this reason, that we regard the exercise of responsibility of the individual as essential for the development of human personality. We hope that the State will not intervene except to provide for the citizen the opportunity to exercise his fundamental rights. We believe that if you deprive the citizen of that social factor you are performing a mental operation which might be described as emasculation and that what you will provide is a mob of mental eunuchs, instead of a group of responsible citizens. I think this is an important point. We hold that if a State accepts all the responsibility of the head of a family that the State is striking at one of the roots of its own strength. If we strike at the root of the family we strike at the root of humanity and civilization.

"We have placed on our agenda for next year, a proposal to add the words, 'to promote peace and human freedom.' I suggest here that the assumption of responsibility and the assumption of control by the State would be an obstacle to human freedom. If we accept such a program we will arrive at a state of social medicine which has been described as follows: The old idea of personal salvation which was

propagated by religious bodies must give way to one of social responsibility that masters must manufacture for men a heaven on earth. In this case if the citizens were to rely only on the State, they would have to beware that the guardian angels did not eventually become the secret police."

Had these remarks been made by an American, it would have occasioned no surprise, but they were made by a European. The particular clause to which these remarks refer was introduced, again not by an American, but by a citizen of a country half way around the world. These people are fighting to protect what freedom they have and to regain some of what they have lost. Shall we fail them? We must not.

Other activities of the Association include the publication of a quarterly *bulletin*. Committees have been appointed to draft a method of coordinating the medical press of the world and to study medical care and allied subjects.

Although only a year old, the Association has made tremendous progress and it is felt that it will rapidly become a powerful force for the improvement of health, the progress of medicine and the promotion of international good-will.

Close liaison has been effective with the World Health Organization so that we may work together and not duplicate each other's efforts. To remove confusion which is prevalent, let me differentiate the two organizations.

The World Health Organization is a branch of the United Nations and represents the governments of the world in medicine, more particularly in the field of public health. Its financial support comes from government funds.

The World Medical Association represents the Medical Associations and the doctors of the world, particularly in the field of medical care and medical education, and receives its support from private funds.

The World Medical Association derives its general income from dues paid by member associations. The amount received is insufficient to make the association a functioning body. Some associations are in such financial straits that they cannot pay their dues. Others who can are unable to send money out of their countries. Hence, if the association is to be active, it must seek funds from other sources.

A United States Committee has been organized and incorporated. The objects of this committee are to assist the World Medical Association in furthering those of its objects which pertain to the promotion of world health, world medicine and world peace. The committee has guaranteed to underwrite the expenses of the World Medical Association in connection with its secretariat, traveling expenses of its Council in attending official meetings (who otherwise could not come) and publication of the *Bulletin*. One of the stipulations was that the secretariat was to be on this side of the Atlantic ocean. This was agreed to and the headquarters of the Association and of the Committee are located in the New York Academy of Medicine, 2 East 103 Street, New York City.

We originally estimated that these expenses would be about $50,000 a year. Now, we know they will be about $100,000.

Membership in the Committee is open to every organization and individual in the United States. Already hundreds of doctors and laymen and many business and medical organizations have become members. Your own organization has become a generous contributing member. May I express the thanks and appreciation of the Committee to your governing body for this.

We desire many thousand individual members. May I express the hope that each of you will become a sustaining member of the Committee. Each member will receive a certificate of membership, the *Bulletin* and all publications of the World Medical Association and the United States Committee. What I trust will be the greatest inducement for you to join, however, is the knowledge that you will be contributing to the advancement of public health, improvement of the standards of medical care and medical education throughout the world and the promotion of international good-will.

The World Medical Association can become an effective organization if it has adequate financial support. Whether or not it succeeds will depend largely upon the doctors of the U. S. The medical profession of the world is looking to us for help. We cannot let them down.

New Books

The Thyroid and Its Diseases. By J. H. Means, Philadelphia, J. B. Lippincott Company, 1948. The tremendous strides made by medical science in disclosing the mysteries of the thyroid gland during the past decade have necessitated a thorough revision of Means' well-known work, which was first published in 1937. The advent of the goitrogenic agents of the thiourea group of drugs, and newer experimental methods involving the use of radioactive iodine and its isotopes, thyroid explants and the various enzymatic systems, have so increased our knowledge that former basic concepts of thyroid physiology and iodine metabolism have had to be considerably altered or flatly rejected in the light of newer information.

Means has succeeded in bringing his book thoroughly up to date and his presentation is both scholarly and lucid. To round out the text to completeness, special chapters on thyroid tumors and thyroid pathology were prepared by Robson, and Oliver Cope has written one on the surgical aspects of thyroid disease.

In its present form, the work is perhaps the most elaborate and comprehensive of its kind currently available and should find its greatest sphere of usefulness as a reference source to anyone interested in the subject. It should prove particularly useful to physiologists and other experimental workers, but would be of dubious value to busy physicians and surgeons, and even less so to the medical undergraduate, to whom current information of clinical importance is more easily available from more elementary publications.

Blood Transfusion. By G. Bazzocchi and G. Bendandi, Milan, Istituto Sieroterapico Milanese, 1948. This Italian work contains a complete presentation of the clinical aspects of transfusion of blood and blood substitutes. It is thorough and up-to-date and indicates returning activity in Italian medicine after the devastating war years.

Hemostatic Agents. By Walter H. Seegers, Elwood A. Sharp, Springfield, Illinois, Charles C Thomas, 1948. The physiologic hemostatic agents are important among recent developments in surgery. Their worth and efficacy in the operating room is so well established that they now constitute a commonplace weapon in the surgeon's armamentarium.

It is thus fitting that this monograph on the subject should appear at the present time in order to give the reader an understanding of the basic physiologic principles involved in the mechanism of blood-clotting; of the principal agents isolated from these various complex reactions; and finally, of the clinical applications of these substances, leading to the common usage of oxidized cellulose, fibrinogen, thrombin and others.

The material is handled in a logical order and is lucidly presented in a comprehensive manner. None of the common agents used in hemostasis is omitted from the discussion.

Zinsser's Textbook of Bacteriology. By David T. Smith, Donald S. Martin and others, Ed. 9, New York, Appleton-Century-Crofts, Inc., 1948. This classic work on bacteriology has been a favorite text among medical students and public health workers ever since its inception in 1910. While the present edition is very different from the original one, the basic approach to the subject remains fundamentally unaltered: not only are the morphologic and biologic characteristics of bacteria described, but great emphasis is laid upon the host-organism relationship. The latter still remains the vital pillar upon which the therapeutic application of bacteriology rests.

Needless to say, the book has been thoroughly revised and brought up to date in all respects. It follows that extensive discussions on the antibiotics, chemotherapy, viruses and rickettsia—all topics of current interest—are present.

The collaborators, garnered from the faculty of Duke University Medical School, are to be congratulated upon the masterly presentation of the microorganisms of clinical importance. To all medical students and others interested in the subject of bacteriology, this work is enthusiastically recommended.

Neurosurgical Pathology. By I. Mark Scheinker, Springfield, Illinois, Charles C Thomas, 1948. It is the reviewer's opinion that this new book represents a significant departure from the usual plan adopted in most textbooks devoted to the surgical aspects of neuropathology. The traditional approach was to describe the gross and microscopic characteristics of the lesion under discussion, to include a brief summary of the clinical features, and perhaps to append a sample case report, complete with pictures. Scheinker, on the other hand, has progressed beyond trite ritual and has attempted, "to establish a functional, dynamic approach to neuropathology." Thus, in the presentation on central nervous system injuries, the author has not merely contented himself with an account of the various types of skull fracture and superficial examples of direct trauma, but has detailed the physiopathologic mechanism and clinical significance of alterations occurring in sites remote from the injured area. To quote the author again: "It becomes increasingly evident that the diffuse damage to the central nervous system, caused by various stages of reversible vascular disturbances (such as vasoparalysis and vasothrombosis) bears importantly upon the sequelae of brain and spinal cord injuries." Similarly, he stresses the importance of the histopathologic reaction of the brain tissue surrounding a tumor, which not infrequently has greater prognostic significance than the biologic characteristics of the tumor itself.

The subject matter is divided into five general chapters. The first chapter deals with cerebral swelling, and the author dispells the popular myth that death following lumbar puncture in cases of supratentorial tumor is due to herniation of the cerebellum into the foramen magnum. While this may be true in some cases of subtentorial neoplasms (e.g., cerebellar lesions), it is not the causative factor in higher lesions. Instead, the author clearly demonstrates that transtentorial herniation of the brain stem is the true mechanism, while milder degrees of protrusion account for such clinical manifestations as irregularities in pulse and respiration, hyperpyrexia and sudden apnea. In such cases the author advocates section of the free edge of the tentorium as a life-saving measure, or establishment of ventricular drainage.

Remaining chapters deal with injuries to the central nervous system including an excellent account of the intervertebral disk syndrome, tumors of the brain and spinal cord, cerebral suppuration, subdural abscess, and hydrocephalus.

The illustrations are clear, of uniform excellence, and in number ample to complement the written material.

Scheinker's work heralds a deviation from the usual pattern, and should meet with a merited success.

Preoperative and Postoperative Care of Surgical Patients. By Hugh C. Ilgenfritz, St. Louis, The C. V. Mosby Company, 1948. Ilgenfritz has produced a comprehensive working text on pre- and postoperative treatment. The necessary prophylactic and corrective procedures are based on a knowledge of physiologic principles and pathogenetic factors, which constitutes a rational approach to this subject. Illustrations are scanty and chiefly schematic. While the prose is clearly written, the style is rather wordy. But this does not detract too much from the general worth of the book, and it is recommended as an excellent addition to the library of anyone concerned with the practice of surgery.

Abstracts from Current Literature

Cholangiography, C. R. Hughes, J. R. Hannan, and B. E. Mulvey, *J.A.M.A.* **137**:687, June 19, 1948.

The authors, in view of their experience with cholangiography in 90 consecutive patients who had had exploration of the common duct for stone, stricture or stenosis of the biliary tract, emphasize that the procedure is an accurate means of determining the presence or absence of disease in the biliary ducts. Cholangiography is a simple procedure and gives more information than surgical exploration of the ducts. Cholangiography should be employed at time of operation; postoperative cholangiograms will confirm the absence of disease in the duct system before the T-tube is removed. In the authors' series postoperative cholangiography was found to be 93.3 per cent accurate in demonstrating common duct stones not found in previous surgical exploration. Cholangiography at the time of operation can lower the incidence of reoperation for stone or for ductal trauma and prevent stricture due to unrecognized operative trauma.

Avulsion Fracture of Lesser Tuberosity of Humerus. Andreasen, *A. T. Lancet*, 1948, **1**:750.

Avulsion fracture of the lesser tuberosity of the humerus is rare. Andreasen has seen one in well over 25,000 fractures. This was a case of a woman 56 years old who slipped while walking her mount. In an effort to break the fall, she gripped the saddle post with her right hand. With her arm fully abducted above the shoulder, the hand fixed and the body moving, an avulsion fracture of the lesser tuberosity of the humerus developed. The circumflex nerve was injured and hemarthrosis occurred. The patient refused operation. Recovery however was complete except for internal rotation at the scapulohumeral joint.

Roentgenograms fourteen months later showed absorption of the small fragment about the lesser tuberosity and a slight irregularity over the original injury site. It was believed that the fracture occurred in the hyperextended, hyperabducted, and mid-intero-external rotation position, a position in which the subscapularis would contract to its greatest advantage.

Modified Operation for Carcinoma of the Rectum with Preservation of the Sphincter. Altman, Leon S., and Kogut, Benjamin, *Ann. J. Surg.*, 1948, **9**:281.

There is no doubt that abdominoperineal resection done in either one or two stages is the ideal procedure for the majority of patients with carcinoma of the rectum. However there are a certain select number of cases of carcinoma of the rectum in which it is possible to remove the carcinoma and adjacent lymphatic tissue adequately and at the same time maintain intestinal continuity with preservation of the sphincter.

The method Altman and Kogut propose demands three requisites: The lesion must be small, it must not extend beyond the fascia propia, and there must be a mobile sigmoid.

A right paramedian incision is made with the patient in steep Trendelenburg position. The abdominal portion of the operation is identical to the usual abdominoperineal procedure. Then a laparotomy pad is placed in the abdominal wound and the patient is placed in the lithotomy position. The anus is dilated manually and a No. 28 Babcock catheter is introduced through the anus to a distance of 8 cm. above the lesion. A suture is placed around the bowel catching the end of the catheter with the suture which is then tied tightly around the gut.

While the assistant guides the bowel from above, it is invaginated through the rectum and out of the anus. This results in an extra-anal intussusception of the lower sigmoid and rectum (intussusceptum) through the anus. This is excised 5 cm. distal to the anus, resulting in removal of the lesion with a portion of normal gut above and below the lesion as well as all gland-bearing tissue. The cut edges are approximated with interrupted sutures going through all layers. The anastomotic site is then reposited through the anus gently. A No. 22 rectal tube is inserted through the anus to a distance of 10 cm. above the site of anastomosis and the tube is anchored to the perianal skin with one suture on each side. A drain is inserted into perirectal space through a stab wound into the ischiorectal fossa.

This procedure permits early discharge from the hospital and perfect sphincter control, and obviates formation of rectal fistulas and strictures.

Alpha-Tocopherol (Vitamin E) in Diseases of the Circulatory System of the Lower Extremities. R. Castagna and G. Impallomeni, *Boll. e Mem. della Soc. Piemontese di Chir.* **18**:155, 1948.

In 7 cases of thrombophlebitis and trophic ulcers of the lower extremities which did not respond to the customary therapeutic measures, massive

doses of vitamin E (250 to 300 mg. daily) proved very efficient and did not affect the general condition of the patients.

The beneficial effect of the vitamins on acute or chronic thrombophlebitis and on trophic ulcers may be attributed either to a direct action on the thrombus, or to a dilatation and new formation of capillaries. The danger of embolism must be considered but such a complication has not been noticed by the author. Further, prolonged observations are required to evaluate this new method.

Healing of Bowel as Influenced by Sulfasuxidine and Streptomycin. E. J. Poth, J. P. McNeil, L. J. Manhoff, W. B. King and J. G. Sinclair, *Surg., Gynec. & Obst.* **86**:641, June 1948.

Controlled experiments were conducted to discover the influence of sulfasuxidine and streptomycin on wound healing in both open and closed or "aseptic" anastomosis. Results present additional evidence of the value of sulfasuxidine in preoperative preparation and postoperative care for surgical procedures on the bowel, and demonstrate that open technics of anastomosis may be more safely employed when sulfasuxidine has been adequately administered. Streptomycin administered orally failed to maintain an alteration of the bacterial flora for a sufficient length of time to permit its experimental evaluation in healing of the large bowel. When it was given simultaneously with sulfasuxidine, the results were essentially those observed when sulfasuxidine is given alone. The difference of healing between the control and treated animals was so striking as to resemble secondary repair in the first instance and primary healing following the alteration of the bacterial flora in the second.

Some Uses of Undetached Omentum in Surgery. J. E. Cannaday, *Am. Jour. of Surg.*, 1948, **2**:502.

The author cites some surgical uses to which free omental grafts may be put. "The ability of a free omental graft to adhere and become viable over a suture line, thereby re-enforcing and adding an extra layer of tissue, probably is the outstanding value of the graft."

Such grafts may be used to cover intestinal anastomoses, perforated viscera, esophageal suture lines, bronchial stumps; and as hemostatic tampons in bleeding from the spleen, kidney, etc. Experimentally, in dogs, autogenous and homologous grafts gave equally good results when applied to pleura, cut surface and edge of lung tissue, bronchus, esophagus, aorta and vena cava. The take was 95 percent in these cases, suggesting the clinical use of omentum in thoracic surgery for "hemostatic effect, reinforcement of suture lines and replacement of defects."

The author cites the work of O'Shaughnessy who implanted omental grafts into the pericardial sac, and into the myocardium as well, with gratifying results, both experimentally and clinically, in cases of angina.

A case report is described wherein the writer successfully dealt with an extensive compound, comminuted fracture of both bones of the left forearm with marked skin and soft tissue destruction, and grossly infected, by means of an omental flap. The flap was later detached at its base and returned to the peritoneal cavity.

Closed Loop Obstruction of the Ascending Colon, with Incomplete Descent of the Cecum, Simulating Acute Cholecystitis. E. A. Gaston, and M. E. Costin, *New England Med. Jour.*, 1948, **239**:705.

The authors stress the urgency for early recognition of acute cholecystitis, and strongly advocate immediate surgery. In this connection, they present two case reports of acute, closed-loop obstruction of the ascending colon in combination with a high-riding cecum due to incomplete rotation of the gut, which were erroneously diagnosed preoperatively as acute cholecystitis. This "diagnostic pitfall—may be avoided if both conditions are kept in mind when acute surgical problems involving the right upper quadrant of the abdomen are encountered." In both cases the constricting lesion was a stenosing cancer in the region of the hepatic flexure.

The main factors upon which the differential diagnosis rests are the following: the site and type of the obstruction; the relative competency of the ileocecal valve; and degree of descent of the cecum.

Colonic obstruction due to carcinoma is a slow-moving affair as a rule, and most cases are due to lesions of the left colon. Patients with a gradually developing obstruction will have chronic complaints, unless sudden, complete obstruction ensues, producing a clinical picture which overshadows the long-standing symptomatology. The writers point out that chronic obstructions due to gradual stenosis of the colon frequently give rise to dyspepsia, sour eructations, and p.c. distress. Such symptoms are often referred to the upper abdomen, and may simulate chronic cholecystitis.

Only 10 percent of all individuals examined by barium enemas reveal competent ileocecal valves. It follows that if the valve is incompetent, then acute obstruction of the colon will result in small bowel distention. But if the valve is fully functional, the distension will be confined to the large

bowel and particularly to the cecum, which may so balloon that there is frequent danger of necrosis and perforation.

When descent of the cecum fails to occur, the organ will be found in the right upper quadrant, and the clinical picture of an acute closed-loop (complete) obstruction may then simulate acute cholecystitis.

Simple flat plates of the abdomen may show a gas filled colon in the right upper quadrant, which would give a clue as to the true nature of the lesion, if the surgeon bears it in mind. But frequently the gas will not show up if the affected segment of bowel has a fluid level. The only absolute method of making an accurate diagnosis preoperatively is by means of a barium enema, and the writers recommend the simple guaiac test as a screening test to indicate which patients with acute surgical abdomens localized to the right upper quadrant would have barium enemas preoperatively. It is assumed positive occult blood will be found in the stool, in cases of acute obstruction due to cancer.

Surgical therapy consists of primary resection, if possible, with end-to-end ileotransverse colostomy, and proximal decompressing ileostomy. Alternatively, the authors mention Lahey's method of exteriorization with an open ileotransverse colostomy. If the cecum is so damaged rendering manipulation impossible, simple cecostomy is advocated for temporary decompression.

Rectal Cancer and Preservation of Function, E. G. Muir, *Brit. Med. J.*, 1948, **8**:286.

No single standard operation is suitable for all cases of rectal or rectosigmoid cancer. The ideal is the efficient removal of the growth with preservation of normal defecation. A permanent colostomy is not too high a price to pay for the efficient removal of a rectal cancer provided it is essential; it is a heavy burden if it is not. Clinical surgery suggests, and pathology supports the view, that in a number of these cases the internal sphincter is needlessly sacrificed through devotion to a stereotyped operation.

Perfect continence requires an intact anorectal ring. Some rely on the external sphincter for control after proctosigmoidectomy, sutured round the sigmoid colon two to four weeks after resection. A varying degree of control may be obtained from the external sphincter even after it has been divided and repaired; certain continence, however, requires an intact anorectal ring, and since the sense of perception is important, an intact lining to the anal canal. A good abdominal colostomy is probably better than an incontinent or untrustworthy anus.

Miles first stressed the lymphatic spread upward in association with the superior hemorrhoidal artery, laterally with the middle hemorrhoidal vessels, and downward with the inferior hemorrhoidal vessels.

Others have shown that the main lymphatic spread of rectal cancer is in an upward direction, lateral and downward spread taking place only when the lymphatic system above is blocked by growth. Few lymphatic glands over 1 inch (2.5 cm.) below a rectal growth are likely to contain metastases, still less those 2 inches (5 cm.) below; and it would seem to be a reasonable conjecture that a distance of 2½ to 3 inches (6.25 to 7.5 cm.) below a growth is outside its lymphatic spread except in advanced cases.

Furthermore it is well known that adenomas are often found in the neighborhood of a rectal cancer, and two primary growths are not uncommon. The surgeon who performs an anastomotic operation must bear in mind the possibility, however small, of another primary growth developing from an adenoma in the rectal stump, or in the remaining portion of the sigmoid colon. It is probable that the majority of patients would prefer to accept this risk rather than a permanent colostomy, but the presence of numerous adenomas below a high rectal growth should be regarded as a contraindication to the retention of any rectal mucosa and therefore to an anastomotic operation.

A preliminary colostomy is not a routine in all methods. A preliminary transverse colostomy, as advocated by Devine, permits the operation to be perfomed on a non-functioning and, through the use of lavage and sulphaphthaladine, an almost sterile bowel. Necrosis and infection are not only more likely, but are also more dangerous when they occur in functional bowel.

In the author's series, 86 consecutive cases of rectal and rectosigmoid cancer were operated upon since the war. Abdominoperineal or other combined operation, abdominal resection and anastomosis, "pull-through" resection and anastomosis, abdominal resection (Hartmann), and perineal resection (palliative), were employed. There were two deaths.

It was concluded that the end results of operations for rectal cancer which preserve a functioning anus were quite as favorable as those obtained by operations requiring a permanent colostomy, and if a judicious selection of cases is made, there is little reason why the results should not be comparable and a permanent colostomy be avoided in certain cases of rectal and rectosigmoid cancer.

Papillary Adenomas of the Large Intestine. D. A. Sunderland and G. E. Binkley. *Cancer,*

From a total of 3356 tumors of the large intestine that were treated on the Colon and Rectum Service of Memorial Hospital (New York) between 1926 and 1946, the authors extracted 48 true cases of papillary adenoma, upon which material they have based a clinical and morphological study.

The authors emphasize the important distinction between papillomas and adenomas: "whereas the adenoma is a tumor of mucosal glands, with little if any involvement of the surface epithelium, the papilloma is the reverse—a tumor primarily of the mucosal surface epithelium with resultant secondary glandular changes." Further, adenomas usually are pedunculated, whilst papillomas are cessile. Nevertheless, papillomas and adenomas have a common origin, and the writers prefer to employ the term papillary adenoma for villous tumors, rather than papilloma.

Of the 48 cases studied, 33 developed malignant change (68 percent of the total).

The incidence of papillary adenomas is low; only 48 cases were found from a total of 3356 (1.4 percent). There is no appreciable sex incidence, and the average age incidence is 62. The most frequent location is the rectum—47 cases.

The most common symptoms are bleeding, morning diarrhea and excretion of mucus. Also observed are anal prolapse of the mass and anal pain.

Treatment consisted in surgical excision of the low-lying lesions. Larger ones, and those situated higher up in the rectum were dealt with by means of the cautery snare, supplemented with irradiation. When carcinomatous change had occurred, radical resection of the rectum was carried out. In two cases, proctosigmoidectomy as described by Bacon was performed, since none of the cases studied showed node invasion, unless the muscular wall of the bowel was involved.

The clinical course of these patients was most unpredictable; and the lesion showed marked propensity for local recurrence. One may regard these tumors as "midway between a benign adenoma and an adenocarcinoma." After local excision, they may remain quiescent for years, or recur repeatedly as benign growth, or abruptly undergo carcinomatous degeneration.

Because of potential malignancy, it is suggested that all tumors showing bizarre epithelial structure on biopsy, should be removed by radical resection of the rectum—perhaps by a "pull-through" procedure. Repeated cautery snare removal or fulgurations are inadequate, unless the lesion is entirely benign, in patients who may be kept under close observation.

Errors in the Diagnosis of Acute Appendicitis. P. Recio, *Acta M. Phil.*, 1948, 5:43.

That the diagnosis of acute appendicitis cannot always be made with certainty and paradoxically is pointed out by the author. "The more experienced the surgeon, the more difficulties he finds in making a positive diagnosis . . . , aware as he is of the numerous pitfalls that lie in wait of the unwary."

Fourteen case reports are presented wherein the preoperative diagnosis was not confirmed by laparotomy. After each instance the writer suffixes a pithy comment explaining how the true pathology was overlooked because of inadequate history-taking or examination.

The author concludes with the following observations:

1. Acute appendicitis does not produce colicky pain; rather it is a severe abdominal discomfort which ultimately localizes in the right iliac region. The pain is less severe than that seen in acute pancreatitis or perforated viscus, and there is no accompanying shock.

2. Vomiting is not a conspicuous feature of early acute appendicitis.

3. Rebound tenderness is invariably present, if the parietes of the peritoneum are involved.

4. The fever rarely goes higher than 38.5°C. in acute appendicitis. Chills are infrequent.

5. Leukocytosis rarely exceeds 18,000 per cubic millimeter.

News Notes

Dr. Fortunato S. Guerrero Honored

A fellowship for advanced thoracic surgery by the Quezon Institute has recently been awarded to Dr. Fortunato S. Guerrero. This came in recognition of his native pioneering work in thoracic surgery in the Philippines.

Dr. Guerrero, for the past 20 years and, without benefit of having studied abroad, has explored heretofore unsurveyed fields of surgery in our country. The first total gastrectomy ever performed in the Philippines is credited to him, and is work in biliary, colonic and rectal surgery are of the highest order.

Dr. Guerrero is chief surgeon of the Quezon Institute, professor and head, Department of Surgery, College of Medicine, Manila Central University. He is a chartered Fellow of the Philippine College of Surgeons, Fellow of the International College of Surgeons.

Fourth International Academic Medical Congress, Sao Paulo, Brazil

The Fourth International Academic Medical Congress will take place in Sao Paulo under the honorable presidency of Prof. Renato Locchi, director of the faculty on July 7, in the amphitheatre of the School of Medicine.

Subjects for discussion will be "Children's T.B.," by Jose Freire Gomes; "Feeding Problems in Brazil and Popular Restaurants," Edgard Barbosa Ribas; "Mechanism of the Action of Insulin," Prof. Isaias Raw, and "Considerations in the Use of Internal Medicine," by Olivio Stersa and Nelson M. Rego.

Other subjects to be treated are, "First Stages of Complex TB in its Different Localities," "Streptomycin in the Treatment of TB," and "Circulatory Volicity in the Lobular Skin."

Scientific Gathering of the Academy of Medicine, Seville, 1948-1949

The Royal Academy of Medical Sciences, in order to open cultural relations with the American countries, hereby opens the first gathering exclusively among residents of the Spanish-American countries under the following conditions:

Those participating will be Spanish doctors, druggists and veterinarians in the work of Spain and America.

The rewards will be, first prize 10,000 pesatas granted by the general director of Cultural Relations of the Ministry of External Affairs. Second prize of 5000 pesatas granted by the Institute of Spanish Culture.

The authors of the first two works will receive the right of publication of their works conceded by the School of Spanish-American Studies at Seville.

The Board of Governors of this Academy compose the certified judges of the present gathering.

The authors will send their work to: Secretary of the Academy Plaza de Espana, Torre Sur, Seville. Papers must be in by the first day of October 1949.

CHAPTER NEWS

THE MEXICAN CHAPTER

Prof. Dr. Francisco Grana, F.I.C.S., (Hon.) president of the International College of Surgeons, and Prof. Dr. Carlos Vi Villaron, F.I.C.S., senior dean of the Faculty of Medicine, University of Lima, have been accorded the title of Honorary Member by the Peruvian Academy of Surgery.

Prof. Dr. Manuel A. Manzanilla, F.I.C.S., (Hon.) vice-president of the International College of Surgeons, has been granted the title of Honorary Member by the Society of Gynecology and Obstetrics of Southeast Mexico. His Excellency, the President of the Republic of Cuba has conferred upon Prof. Manzanilla, the position of Dean of the Faculty of Medicine, University of Mexico, and the decoration of the National Order of Merit, "Carlos J. Finlay," in the rank of Official.

Prof. Dr. Jorge de Moraes Grey, Brazil, F.I.C.S., was appointed Dean of Operative Technique and Experimental Surgery of the Faculty of Medicine, Rio de Janeiro.

THE FINNISH CHAPTER

Prof. A. R. Elfving lectured on, "Tumors of the Bladder with Particular Attention Paid to Their Conservative Treatment," at the Chapter's meeting, November 19, 1948 in Helsinki. Prof. Juuso Kivimaki reported on his journey for study in England.

In Memoriam

JOSEPH L. BELLIOTTI

M.D., F.I.C.S., F.A.C.S.

With the death on October 27, 1948, of Dr. Joseph Louis Belliotti the International College of Surgeons, United States Chapter, lost a highly valued Fellow and its Regent for the State of Rhode Island. Dr. Belliotti was born in Buffalo, New York, where he also received his early education; his medical training was acquired at the University of Buffalo Medical School. He served as interne in several Rhode Island hospitals, notably St. Joseph's Hospital of Providence, where he became Resident in 1919. He then made his home in Providence, establishing there his surgical practice.

Dr. Belliotti belonged to numerous societies, among them the American Medical Association, American College of Surgeons, Rhode Island State Medical Society, Providence Medical Association, Malpighii Medical Club of Rhode Island, Association of Military Surgeons of the United States and the Rhode Island Society of Industrial Physicians and Surgeons. In 1947 Dr. Belliotti was appointed to the Board of Trustees of State Colleges.

ROBERT ALOYSIUS GAUGHAN

M.D., F.A.C.S., F.I.C.S.

The death of an esteemed Fellow of the International College of Surgeons, Robert Aloysius Gaughan, is recorded with regret. Dr. Gaughan was born in Hazleton, Pennsylvania, and returned there to serve his community as surgeon after his medical education at the University of Pennsylvania, 1913. He served as Prefector in Surgery in the University of Pennsylvania Post Graduate School. He served his internship in the Hazleton State Hospital, which was followed by a five-year residency in the same hospital. In 1928 he became Chief Surgeon and served as Chief of Staff until his untimely death in October, 1948. He belonged to numerous societies and was a member of the American Board of Surgery.

EDWARD LELAND KELLOGG

M.D., F.I.C.S.

The field of gastro-intestinal ailments has lost one of its most active members through the death of Edward Leland Kellogg. Dr. Kellogg, chief medical executive officer of the Polyclinic Hospital, New York City, was born in Homer, Cortland County, N. Y., and he graduated from the Homer Academy. After a year at the School of Social Economics in this city, he decided to make medicine his profession and entered the College of Physicians and Surgeons, Columbia University, from which he received his M.D., and the Harzen prize in 1895. The doctor served his internship in Bellevue Hospital, and then was for three years superintendent and resident physician of the Minturn Hospital. Later he was consulting surgeon and, for a time, director of surgery in the Gouverneur Hospital, director of surgery in the Manhattan General Hospital and attending surgeon to St. Bartholomew's Hospital. Dr. Kellogg was attending surgeon to the Polyclinic Hospital and professor of surgery in the Polyclinic Medical School when he died at the age of 76.

VERNON GAROLD JEURINK

M.D., F.A.C.S., F.I.C.S.

On July 6, 1948, the International College of Surgeons lost one of its most esteemed Fellows. Born in Kansas, Vernon Garold Jeurink received his medical degree from the University of Colorado in 1927, and settled to practice in Denver, specializing in surgery of the colon and rectum. He held connections with the Children's Hospital, St. Luke's, St. Anthony's and Mercy Hospitals of Denver. In his time he served as Secretary of the American Proctologic Society. Among his society affiliations were the American Medical Association, American College of Surgeons, International College of Surgeons, Colorado State and County Medical Societies and the Midwest Proctologic Society. He also served as a member of the American Board of Surgery.

JOHN M. WILSON

M.D., F.A.C.S., F.I.C.S.

The International College of Surgeons has lost one of its staunchest and proudest members with the death of John M. Wilson, November 1948. Dr. Wilson, born in Grove Hill, Ala., November 18, 1883, served his native state until his death as member and past president of staff of the Providence Hospital, Mobile. He belonged to various state medical and surgical societies, and was a member of the American Association for Study of Goiter.